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# Preliminary Report: Pulp, Paper, and Paperboard Detailed Study

U.S. Environmental Protection Agency  
Engineering and Analysis Division  
Office of Water  
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## ACRONYMS

|                  |   |
|------------------|---|
| 2,3,7,8-TCDD     | 2,3,7,8-tetrachlorodibenzo- <i>p</i> -dioxin  |
| 2,3,7,8-TCDF     | 2,3,7,8-tetrachlorodibenzofuran   |
| AF&PA            | American Forest and Paper Association   |
| AOX              | Adsorbable Organic Halides.   |
| BAT              | Best Available Technology Economically Achievable   |
| BCT              | Best Conventional Pollutant Control Technology  |
| BOD <sub>5</sub> | Five-day Biochemical Oxygen Demand  |
| BPK              | Bleached Papergrade Kraft   |
| BPT              | Best Practicable Control Technology   |
| CDD              | Chlorinated Dibenzo- <i>p</i> -Dioxins  |
| CDF              | Chlorinated Dibenzofurans   |
| CFR              | Code of Federal Regulations   |
| COD              | Chemical Oxygen Demand  |
| CTMP             | Chemi-Thermo-Mechanical Pulp  |
| CWA              | Clean Water Act   |
| DCN              | Document Control Number   |
| DMR              | Discharge Monitoring Reports  |
| ECF              | Elemental Chlorine-Free   |
| EDS              | Effluent Data Statistics  |
| ELGs             | Effluent Limitations Guidelines and Standards   |
| EPA              | U.S. Environmental Protection Agency  |
| FR               | Federal Register  |
| ML               | Minimum Level   |
| NAICS            | North American Industry Classification System   |
| NCASI            | National Council of the Paper Industry for Air and Stream Improvement, Inc.                             |
| NESHAP           | National Emission Standards for Hazardous Air Pollutants  |
| NPDES            | National Pollutant Discharge Elimination System   |
| NSPS             | New Source Performance Standards  |
| PAC              | Polycyclic Aromatic Compounds   |
| PAH              | Polycyclic Aromatic Hydrocarbons  |
| PCS              | Permit Compliance System  |
| pH               | Negative logarithm of the effective hydrogen-ion concentration in moles per liter, a measure of acidity |
| POTW             | Publicly Owned Treatment Works  |
| PS               | Papergrade Sulfite  |
| PSES             | Pretreatment Standards for Existing Sources   |
| PSNS             | Pretreatment Standards for New Sources  |
| SIC              | Standard Industrial Classification  |
| TCF              | Totally Chlorine-Free   |
| TMP              | Thermo-Mechanical Pulp  |
| TRI              | Toxics Release Inventory  |
| TWPE             | Toxic-Weighted Pound Equivalents  |
| TWFs             | Toxic Weighting Factors   |
| VATIP            | Voluntary Advanced Technology Incentives Program  |



## GLOSSARY

**2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) and 2,3,7,8-tetrachlorodibenzofuran (2,3,7,8-TCDF)** - Two CDD and CDF congeners with chlorine substitution of hydrogen atoms at the 2, 3, 7, and 8 positions on the benzene rings. EPA promulgated 1998 Cluster Rules which included ELGs for these two congeners. Because of the ELGs, most pulp and paper mills are typically required to monitor for 2,3,7,8-TCDD and 2,3,7,8-TCDF and these monitoring results are compiled in EPA's Permit Compliance System.

**Adsorbable Organic Halides (AOX)** - A bulk parameter that measures the total mass of chlorinated organic matter in water and wastewater.

**American Forest and Paper Association (AF&PA)** - The national trade association of the forest, pulp, paper, paperboard and wood products industry. AF&PA represent member companies engaged in growing, harvesting and processing wood and wood fiber, manufacturing pulp, paper and paperboard products from both virgin and recycled fiber, and producing engineered and traditional wood products.

**Bleach plant** - All process equipment used for bleaching beginning with the first application of bleaching agents (e.g., chlorine, chlorine dioxide, ozone, sodium or calcium hypochlorite, or peroxide), each subsequent extraction stage, and each subsequent stage where bleaching agents are applied to the pulp. For mills in Subpart E producing specialty grades of pulp, the bleach plant includes process equipment used for the hydrolysis or extraction stages prior to the first application of bleaching agents. Process equipment used for oxygen delignification prior to the application of bleaching agents is not part of the bleach plant.

**Bleach plant effluent** - The total discharge of process wastewaters from the bleach plant from each physical bleach line operated at the mill, comprising separate acid and alkaline filtrates or the combination thereof.

**Bleached pulp** - Pulp that has been purified or whitened by chemical treatment to alter or remove coloring matter and has taken on a higher brightness characteristic.

**Bleaching** - The process of further delignifying and whitening pulp by chemically treating it to alter the coloring matter and to impart a higher brightness.

**Bleaching chemicals** - A variety of chemicals used in the bleaching of pulp such as chlorine ( $\text{Cl}_2$ ), sodium hypochlorite ( $\text{NaOCl}$ ), calcium hypochlorite ( $\text{Ca}(\text{OCl})_2$ ), chlorine dioxide ( $\text{ClO}_2$ ), peroxide ( $\text{H}_2\text{O}_2$ ), oxygen ( $\text{O}_2$ ), ozone ( $\text{O}_3$ ), and others. Also referred to as bleaching chemical.

**Conventional pollutants** - The pollutants identified in Section 304(a)(4) of the CWA and the regulations thereunder (biochemical oxygen demand ( $\text{BOD}_5$ ), total suspended solids (TSS), oil and grease, fecal coliform, and pH).

**Cluster Rules** - The Cluster Rules apply to mills with operations subject to 40 CFR Part 430 Subpart B, Bleached Papergrade Kraft and Soda, and Subpart E, Papergrade Sulfite. The Cluster

## GLOSSARY (Continued)

Rules regulate toxic and nonconventional pollutants that are characteristic of mills that bleach chemical pulp with chlorine-containing compounds. These pollutants include adsorbable organic halides (AOX), chloroform, TCDD, TCDF, and 12 chlorinated phenolic compounds.

**Deinked Pulp** - Fiber reclaimed from wastepaper by removing ink, coloring materials, and fillers.

**Dioxin and Dioxin-like Compounds** - The 17 CDDs and CDFs compounds (called congeners) which include chlorine substitution of hydrogen atoms at the 2, 3, 7, and 8 positions on the benzene rings. The 17 congeners are referred to as 'dioxin-like,' because of the similar chemical structure, similar physical-chemical properties, and invoke a common battery of toxic responses, though the toxicity of the congeners varies greatly. The TRI method of reporting requires that facilities report the total mass of all 17 congeners.

**Direct discharger** - A facility that discharges or may discharge treated or untreated process wastewaters, non-contact cooling waters, or non-process wastewaters (including stormwater runoff) into waters of the United States.

**Discharge Monitoring Reports (DMRs)** - Compliance reports required by NPDES permits. Facilities with major discharges are required to monitor their discharges and submit monitoring reports to their permitting authority at a frequency specified by the permit.

**Effluent Data Statistics (EDS)** - An EPA mainframe computer program that calculates facility annual pollutant loads (kg/year) using compliance monitoring data reported in PCS.

**Effluent limitation** - Any restriction, including schedules of compliance, established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean.

**Effluent limitations guidelines and standards (ELGs)** - Categorical regulations developed by EPA as required by the Clean Water Act.

**Elemental chlorine-free (ECF)** - Any process for bleaching pulps in the absence of elemental chlorine and hypochlorite that uses chlorine dioxide as the only chlorine-containing bleaching agent.

**Fiber line** - A series of operations employed to convert wood or other fibrous raw material into pulp. If the final product is bleached pulp, the fiber line encompasses pulping, de-knotting, brownstock washing, pulp screening, centrifugal cleaning, and multiple bleaching and washing stages.

**Final effluent** - Pulp or paper mill wastewater discharges to receiving waters including streams, lakes, and other waters of the U.S.

## GLOSSARY (Continued)

**Indirect discharger** - A facility that discharges or may discharge wastewaters into a publicly owned treatment works or a treatment works not owned by the discharging facility.

**Integrated mill** - A mill that produces pulp and may use none, some, or all of that pulp (often in combination with purchased pulp) to produce paper or paperboard products.

**Kraft process** - Sulfate chemical pulping process.

**Mechanical pulp** - Pulp produced by reducing pulpwood logs and chips into their fiber components by the use of mechanical energy (at CMP or CTMP mills, also with the use of chemicals or heat), via grinding stones or refiners.

**Minimum level (ML)** - The level at which the analytical system gives recognizable signals and an acceptable calibration point. The MLs for pollutants regulated by the Cluster Rules are specified in 40 CFR 430.01(i).

**North American Industry Classification System (NAICS)** - A system for classifying economic activity developed jointly by the U.S., Canada, and Mexico.

**National Council of the Paper Industry for Air and Stream Improvement, Inc (NCASI)** - An independent, non-profit research institute that focuses on environmental topics of interest to the forest products industry. NCASI is a source of data on environmental issues affecting this industry, and has more than 75 member companies throughout the US and Canada.

**Nonconventional pollutants** - Pollutants that are neither conventional pollutants nor priority pollutants (see 40 CFR Section 401.15 and Part 423, Appendix A).

**National Pollutant Discharge Elimination System (NPDES)** - The NPDES program is authorized by the Clean Water Act and requires permits for the discharge of pollutants from any point source into waters of the United States.

**Outfall** - The mouth of conduit drains and other conduits from which a mill effluent discharges into receiving waters.

**Picograms (pg)** - one trillionth ( $10^{-12}$ ) of a gram. One pg/liter is equivalent to one part per quadrillion (ppq).

**Polycyclic Aromatic Compounds (PAC)** - Sometimes known as polycyclic aromatic hydrocarbons (PAHs), are a class of organic compounds consisting of two or more fused aromatic rings.

**PCSLoads2002** - A Microsoft Access™ database in which EPA has compiled data taken from PCS, the calculated TWPE, and the relationship between SIC codes and regulatory categories.

## GLOSSARY (Continued)

**Permit Compliance System (PCS)** - An EPA mainframe database created by EPA to track permit, compliance, and enforcement status of facilities regulated by the National Pollutant Discharge Elimination System (NPDES) program under the CWA.

**Peroxide** - A short name for hydrogen peroxide ( $H_2O_2$ ) or sodium peroxide ( $Na_2O_2$ ).

**Polychlorinated dibenzo-p-dioxins (CDDs) and polychlorinated dibenzofurans (CDFs)** - CDDs and CDFs constitute a group of persistent, bioaccumulative, and toxic chemicals. Facilities are required to report to EPA's TRI the total mass of 17 of these CDDs and CDFs released to the environment every year. The 17 compounds (called congeners) are referred to as 'dioxin-like,' because they have similar chemical structure, similar physical-chemical properties, and invoke a common battery of toxic responses, though the toxicity of the congeners varies greatly.

**Pretreatment standard** - A regulation addressing industrial wastewater effluent quality required for discharge to a POTW.

**Process wastewater** - For the effluent guidelines for Subparts B and E of the Pulp, Paper, and Paperboard Category (40 CFR Part 430), process water is any water that, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. For purposes of Subparts B and E, process wastewater includes boiler blowdown; wastewaters from water treatment and other utility operations; blowdowns from high rate (e.g., greater than 98 percent) recycled non-contact cooling water systems to the extent they are mixed and co-treated with other process wastewaters; wastewater, including leachates, from landfills owned by pulp and paper mills subject to Subparts B or E if the wastewater is commingled with wastewater from the mill's manufacturing or processing facility; and storm waters from the immediate process areas to the extent they are mixed and co-treated with other process wastewaters. Contaminated groundwaters from on-site or off-site groundwater remediation projects are not process wastewater.

**Process water** - Water used to dilute, wash, or carry raw materials, pulp, and any other materials used in the manufacturing process.

**Pretreatment Standards for Existing Sources (PSES)** - categorical regulations for indirect dischargers designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs, including sludge disposal methods at POTWs.

**Pulp and Paper Category, Phase I** - When EPA revised 40 CFR Part 430 in 1998, it reorganized the category into 12 subcategories and promulgated new ELGs for two subcategories, Subpart B (Bleached Papergrade Kraft and Soda) and Subpart E (Papergrade Sulfite). Subparts B and E became known as Phase I; EPA promulgated revised ELGs for these subparts April 15, 1998 (63 FR 18504; April 15, 1998).

## **GLOSSARY (Continued)**

**Pulp and Paper Category, Phase II** - EPA planned to promulgate ELGs for the Phase II subcategories (Subparts C and F through L) after promulgating the final rules for the Phase I subcategories.

**Pulp and Paper Category, Phase III** - The two dissolving pulp subcategories (Subpart A, Dissolving Kraft, and Subpart D, Dissolving Sulfite).

**Pulp bleaching** - The process of further delignifying and whitening pulp by chemically treating it to alter the coloring matter and to impart a higher brightness.

**Secondary fiber** - Furnish consisting of recovered material. Secondary fiber includes recycled paper or paperboard known commonly as "post-consumer" recycled material. The term secondary fiber is used both for the raw material (wastepaper, old corrugated containers, etc.) and the pulp produced from the wastepaper and board.

**Standard Industrial Classification (SIC)** - A system for classifying economic activity developed by the Office of Management and Budget and used by other government agencies, including EPA, to promote data comparability. In the SIC system, each establishment is classified according to its primary economic activity, which is determined by its principal product or group of products. An establishment may have activities in more than one SIC code.

**Soda process** - A chemical pulping process that consists of the reduction of chips to their individual fiber components by use of cooking liquor made up of caustic soda (NaOH) solution, the recovery and preparation of this liquor, or the treatment of pulp and paper produced from it.

**Sulfite process** - An acid pulp manufacturing process in which chips are reduced to their component parts by cooking (digesting) in a pressurized vessel using a liquor of calcium, sodium, magnesium or ammonia salts of sulfurous acid.

**Totally chlorine-free (TCF) bleaching** - Pulp bleaching operations that are performed without the use of chlorine, sodium hypochlorite, calcium hypochlorite, chlorine dioxide, chlorine monoxide, or any other chlorine-containing compound.

**Toxics Release Inventory (TRI)** - TRI is the common name for Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA). Each year, facilities that meet certain thresholds must report their releases and other waste management activities for listed toxic chemicals. That is, facilities must report the quantities of toxic chemicals recycled, collected and combusted for energy recovery, treated for destruction, or disposed of. A separate report must be filed for each chemical that exceeds the reporting threshold. EPA compiles the reported information into a publicly-available database known as the Toxics Release Inventory.

**Toxic-weighted pound equivalents (TWPE)** - Multiplying the pounds of pollutants discharged by chemical-specific toxic weighting factors results in an estimate of toxic-weighted pound equivalents (TWPE).

## **GLOSSARY (Continued)**

**Toxic weighting factors (TWFs)** - Weighting factors that reflect both aquatic life and human health effects and were developed by Office of Water/Engineering and Analysis Division (EAD) for use in regulatory development.

***TRIReleases2002*** - A Microsoft Access™ database in which EPA has compiled data taken from TRI, the adjusted releases from POTWs to surface waters, the calculated TWPE, and the relationship between SIC codes and regulatory categories.

**Unbleached pulp** - Pulp that has not been treated in a bleaching process.

**Voluntary Advanced Technology Incentives Program (VATIP)** - The program established under 40 CFR Part 430.24(b) (for existing direct dischargers) and 40 CFR Part 430.25(c) (for new direct dischargers) whereby participating mills agree to accept enforceable effluent limitations and conditions in their NPDES permits that are more stringent than the “baseline BAT limitations or NSPS” that would otherwise apply, in exchange for regulatory- and enforcement-related rewards and incentives.

**Wastewater** - Water carrying waste materials from a facility. It is a mixture of water, and dissolved and suspended pollutants.

## 1.0 INTRODUCTION

Section 304(b) of the Clean Water Act requires EPA to annually review and, if appropriate, revise its technology-based regulations, called “effluent limitations guidelines and standards” or “effluent guidelines.” These guidelines limit the discharge of pollutants to waters of the United States from various categories of industrial facilities. Every other year, Section 304(m) of the Clean Water Act requires EPA to publish a plan establishing a schedule for the annual review and revision of effluent guidelines required by Section 304(b). EPA last published an Effluent Guidelines Program Plan in 2004 (64 FR; 53705; September 2, 2004).

During its 2005 screening-level analysis of discharges from categories with existing regulations, EPA determined that the Pulp, Paper, and Paperboard Point Source Category ranked higher than any other category in discharges of toxic and nonconventional pollutants<sup>1</sup>. For more information on the development of the category ranking see the *2005 Screening-Level Analysis Report* [1]. Because of these findings, EPA is conducting a more detailed study of this category. During this study, EPA will first verify that the pollutant discharges reported to PCS and TRI for 2002 accurately reflect the current discharges of the industry. EPA will also perform an in-depth analysis of the reported pollutant discharges, and as appropriate, will review technology innovation and process changes including a preliminary assessment of technology cost and affordability. Additionally, EPA will consider whether there are industrial sectors not currently subject to effluent guidelines or pretreatment standards that should be considered potential new subcategories of this category. The purpose of the detailed study is to determine whether it would be appropriate for EPA to revise the existing effluent guidelines. EPA’s decision to conduct a detailed study on this category does not mean that EPA is required to revise its regulations for this category. EPA will make such a decision as part of the final 2006 Effluent Guidelines Program Plan.

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<sup>1</sup>One mill accounted for more than 99% of 2,3,7,8-tetrachlorodibenzo-p-dioxin discharges tallied in EPA’s Permit Compliance System (PCS) for this industrial category in 2002. With or without these discharges from this one mill, this category ranks higher than any other category in terms of the estimated combined 2002 toxic discharges from EPA’s Toxic Release Inventory (TRI) and PCS databases. See Section 3.3 for more discussion of this mill’s discharges.

## 1.1 Industry Description

Mills that manufacture pulp, paper, or paperboard are generally classified under three Standard Industrial Classification (SIC) codes that identify their principal product or group of products. The three SIC codes assigned to the Pulp, Paper, and Paperboard Point Source Category (hereafter, the Pulp and Paper Category) are:

- SIC Code 2611 - Pulp Mills: Establishments primarily engaged in manufacturing pulp from wood or from other materials, such as rags, linters, wastepaper, and straw.
- SIC Code 2621 - Paper Mills: Establishments primarily engaged in manufacturing paper from wood pulp and other fiber pulp, and which may also manufacture converted paper products.
- SIC Code 2631 - Paperboard Mills: Establishments primarily engaged in manufacturing paperboard, including paperboard coated on the paperboard machine, from wood pulp and other fiber pulp; and which may also manufacture converted paperboard products.

A mill may have activities in one or more SIC code. For example, integrated mills make pulp from wood or other raw materials (SIC code 2611). They then use this pulp to make paper (SIC code 2621) and/or paperboard (SIC code 2631). Thus, an integrated mill's primary product may be paper, but it also manufactures pulp. The pulp manufacturing operations are likely to be the major source of wastewater pollutants. A non-integrated mill does not make pulp, but purchases pulp to make paper or paperboard.

Table 1-1 lists the three SIC codes assigned to the Pulp and Paper Category and eight SIC codes for facilities that make products from paper or paperboard. EPA is considering including operations of these eight additional SIC codes as potential new subcategories of the Pulp and Paper Category. See Section 5.3 of the *2005 Screening-Level Analysis Report* [1].

Table 1-1 also lists the North American Industrial Classification System (NAICS) codes that apply to the pulp and paper industry. The U.S. Economic Census reports data by the NAICS code. However, the wastewater discharge information in EPA's TRI and PCS databases



is organized by SIC code. For this reason, to compare the number of facilities enumerated by the census to the number of facilities in the EPA databases, the NAICS data in Table 1-1 have been converted to the equivalent SIC code. Note that SIC codes 2621, 2671, and 2679 do not translate directly to individual NAICS codes.

**Table 1-1. Number of Pulp and Paper Facilities**

| SIC Code                           | NAICS Code       | Point Source Category   | 2002 U.S. Economic Census | 2002 TRI <sup>1</sup> | 2002 PCS <sup>2</sup> |           |
|------------------------------------|------------------|---|---------------------------|-----------------------|-----------------------|-----------|
|                                    |                  |   |                           |                       | Major                 | Minor     |
| 2611                               | 3221-10          | Pulp Mills  | 32                        | 76                    | 88                    | 9         |
| 2621                               | 3221-21, 3221-22 | Paper Mills   | 329                       | 151                   | 120                   | 21        |
| 2631                               | 3221-30          | Paperboard Mills  | 199                       | 101                   | 44                    | 10        |
|                                    |                  |   | <b>560</b>                | <b>328</b>            | <b>252</b>            | <b>40</b> |
| <b>Potential New Subcategories</b> |                  |   |                           |                       |                       |           |
| 2653                               | 3222-11          | Corrugated and Solid Fiber Boxes                                  | 1,719                     | 16                    |                       | 6         |
| 2655                               | 3222-14          | Fiber Cans, Tubes, Drums, and Similar Products                    | 261                       | 2                     |                       |           |
| 2656                               | 3222-15          | Sanitary Food Containers, Except Folding                          | 72                        | 4                     |                       | 4         |
| 2657                               | 3222-12          | Folding Paperboard Boxes, Including Sanitary                      | 490                       | 7                     |                       | 1         |
| 2671                               | 3222-21, 326112  | Packaging Paper and Plastics Film, Coated and Laminated           | 391                       | 50                    |                       | 10        |
| 2672                               | 3222-22          | Coated and Laminated Paper, Not Elsewhere Classified              | 541                       | 90                    |                       | 2         |
| 2674                               | 3222-24          | Uncoated Paper and Multiwall Bags                                 | 123                       | 1                     |                       |           |
| 2679                               | 3222-31, 3222-99 | Converted Paper and Paperboard Products, Not Elsewhere Classified | 869                       | 11                    |                       | 4         |
|                                    |                  |   | <b>4,466</b>              | <b>181</b>            | <b>0</b>              | <b>27</b> |

Source: U.S. Economic Census, 2002; *TRIReleases2002*; *PCSLoads2002*.

<sup>1</sup>Releases to any media.

<sup>2</sup>PCS is divided into major and minor dischargers.

As shown in Table 1-1, more facilities are identified as SIC code 2611 (pulp mills) in EPA's TRI and PCS databases than are counted in the census as establishments primarily engaged in manufacturing pulp. For the census, facilities are assigned to an SIC code based on the revenues from products sold. For TRI, facilities identify the SIC codes that are the

source of their toxic releases. For PCS, permitting authorities identify the SIC code that is the sources of wastewater discharges. Many mills manufacture pulp but use it on site to make paper instead of selling it on the market. Also, pulping operations generate more pollutant loads than paper and paperboard manufacturing operations. For these reasons, the number of facilities identified as pulp mills in EPA's databases is greater than the number of pulp mills counted by the census .

Table 1-1 also shows that EPA's databases have information for more facilities in the three SIC codes assigned to the Pulp and Paper Category than they do for the eight SIC codes that are potential new subcategories. More than 50% of the facilities counted by the census for the three SIC codes assigned to the Pulp and Paper Category have data in EPA's databases compared to less than 5% of facilities in the eight SIC codes that are potential new subcategories.

## **1.2            Regulatory Background**

Between 1974 and 1986, EPA promulgated effluent limitations guidelines and standards (ELGs) for the Pulp and Paper Category. For these regulations, EPA divided the industry into 25 subcategories, based on the products made and processes used at the mills.

A 1988 legal suit obligated EPA to address discharges of polychlorinated dibenzo-(p)-dioxins and polychlorinated dibenzofurans<sup>2</sup> from 104 bleaching pulp mills, including nine dissolving pulp mills. While meeting that obligation, EPA also reviewed ELGs for the entire Pulp and Paper Category. As part of that review, EPA reorganized the category into 12 subcategories. Although the Pulp and Paper Category regulations apply to all facilities in SIC codes 2611, 2621, and 2631, the 12 subcategories are organized by process used and product produced and do not correspond to SIC codes.

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<sup>2</sup>Polychlorinated dibenzo-p-dioxins (CDDs) and polychlorinated dibenzofurans (CDFs) constitute a group of persistent, bioaccumulative, and toxic chemicals. Facilities are required to report to EPA's TRI the total mass of 17 of these CDDs and CDFs released to the environment every year. In this report, EPA uses the term "dioxins" to refer to the total mass of the 17 CDDs and CDFs, as reported to TRI.

For discharges from certain mills in the Pulp and Paper Category, EPA promulgated ELGs for two specific dioxins: 2,3,7,8-tetrachlorodibenzo-p-dioxin and 2,3,7,8-tetrachlorodibenzofuran. In this report, these compounds are referred to as TCDD and TCDF, respectively. See Section 3.1 of this report for a discussion of dioxins.

During its response to the 1988 legal suit, EPA decided to review and revise the Pulp and Paper Category regulations in three phases. Table 1-2 presents these three phases and the subcategories EPA planned to address in each phase.

**Table 1-2. Relationship Between Pulp and Paper Regulatory Phases and Subcategories**

| Phase | Subpart | Subcategory  |
|-------|---------|--|
| I     | B       | Bleached Papergrade Kraft and Soda                           |
| I     | E       | Papergrade Sulfite   |
| II    | C       | Unbleached Kraft   |
| II    | F       | Semi-Chemical  |
| II    | G       | Groundwood, Chemi-Mechanical, and Chemi-Thermo-Mechanical    |
| II    | H       | Non-Wood Chemical Pulp                                       |
| II    | I       | Secondary Fiber Deink  |
| II    | J       | Secondary Fiber Non-Deink                                    |
| II    | K       | Fine and Lightweight Papers from Purchased Pulp              |
| II    | L       | Tissue, Filter, Non-Woven and Paperboard from Purchased Pulp |
| III   | A       | Dissolving Kraft   |
| III   | D       | Dissolving Sulfite   |

Note: EPA promulgated revised ELGs for Phase I, known as the Cluster Rules, April 15, 1998. EPA has not promulgated revised ELGs for Phase II or Phase III.

In revising the Pulp and Paper Category regulations, EPA first addressed two subcategories, Subpart B (Bleached Papergrade Kraft and Soda) and Subpart E (Papergrade Sulfite), because these subparts applied to the majority of the 104 mills identified in the 1988 suit. Subparts B and E became known as Phase I; EPA promulgated revised ELGs for these subparts April 15, 1998 (63 FR 18504; April 15, 1998). EPA promulgated the Phase I ELGs at the same time it promulgated National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for kraft and sulfite pulp mills. Because these water and air regulations were developed, analyzed, and promulgated jointly, they are called the Cluster Rules.

Eight subcategories are known as Phase II and are listed in Table 1-2. EPA has not revised the ELGs for these subcategories which were promulgated between 1974 and 1986.

Phase III affected the two dissolving pulp subcategories (Subpart A, Dissolving Kraft, and Subpart D, Dissolving Sulfite). EPA did not promulgate revised ELGs addressing TCDD and TCDF for Phase III in 1998, because the affected companies were undertaking a multiyear laboratory study and mill trial to develop alternative bleaching technologies. EPA anticipated that final ELGs would be based on different technologies than those that served as the basis for the Phase I regulations. As of August 2004, there were only four operating mills in these two subcategories. As part of its 2004 Effluent Guidelines Program Plan, EPA determined that rather than promulgate revised ELGs for Phase III mills, EPA would support NPDES permit writers individually in developing permit-specific effluent limitations to control TCDD and TCDF releases from these four mills.

### **1.3            Detailed Study Scope**

EPA decided to conduct a detailed study of the Pulp and Paper Category because it ranked highest among all point source categories for toxic and nonconventional pollutant discharges in the *2005 Screening-Level Analysis Report* [1]. Only Phase I and Phase II mills are the subject of this study because, as noted above, EPA previously determined that it would not promulgate revised ELGs for Phase III mills.

This study will focus, in part, on determining how the 1998 Cluster Rules have been implemented and their effect on mill discharges. Because the Cluster Rules apply to Phase I mills, but not to Phase II mills, the regulatory implementation part of the detailed study addresses only Phase I mills. As an additional focus, this study will investigate the non-bleaching sources of toxic pollutants discharged from pulp and paper mills. These pollutants include dioxins, polycyclic aromatic compounds (PACs), metals, ammonia, and possibly others, that are discharged from Phase I and Phase II mills.

EPA's detailed study plan identified key questions the detailed study will seek to answer [2]. These questions include:

- Have the Cluster Rules been incorporated into NPDES permits for Phase I mills?

- Are Phase I mills in compliance with the Cluster Rules?
- Are TCDD and TCDF present in bleach plant effluents? Are TCDD, TCDF, or other dioxin congeners discharged from non-bleaching pulp and paper mills? If so, what is the source of these discharges?
- What are the sources of other toxic pollutants (PACs, metals, ammonia, and possibly others) discharged from pulp and paper mills?
- To what extent are facilities reporting wastewater discharges of toxic chemicals to TRI? How are mills estimating their TRI-reported discharges?

#### **1.4      Detailed Study Status**

This report describes the status of EPA's detailed study of the Pulp and Paper Category (hereafter, pulp and paper detailed study) as of July 2005. EPA has made progress in verifying TRI- and PCS-reported discharges and has collected Phase I mill NPDES permits with the help of the trade association and industry. EPA is in the process of verifying that Cluster Rules guidelines have been incorporated into permits and that Phase I mills are in compliance with their Cluster Rules-based permit limits. EPA is continuing to collect information from individual facilities and NPDES permit writers and is beginning to review published technical information to understand potential pollutant sources and control alternatives.

This report presents the preliminary results of EPA's detailed study and details EPA's request for additional information to support its completion of the study. This report is organized in the following sections:

- Section 2.0: Data Sources;
- Section 3.0: Pulp and Paper Category Wastewater Pollutants;
- Section 4.0: Cluster Rule Implementation and Impact;
- Section 5.0: Review of TRI Data; and
- Section 6.0: Next Steps.

## **2.0 DATA SOURCES**

This section describes the data sources used for the pulp and paper detailed study as well as potential data quality limitations. Specific data sources used for this investigation include readily available information from EPA's TRI and PCS databases, pulp and paper mill National Pollutant Discharge Elimination System (NPDES) permits and related fact sheets, and information provided by two industry groups, the American Forest and Paper Association (AF&PA) and the National Council for Air and Stream Improvement (NCASI). AF&PA is the national trade association of the forest, pulp, paper, paperboard, and wood products industry. NCASI is an independent, nonprofit research institute funded by the forest products industry, including pulp and paper companies, many of which are also members of AF&PA.

The data sources used to date by EPA for the detailed study are described in the following subsections:

- Section 2.1: PCS;
- Section 2.2: TRI;
- Section 2.3: NPDES Permits; and
- Section 2.4: Information Provided by Industry and Trade Associations.

### **2.1 PCS**

For its 2005 screening-level analysis, EPA used discharge monitoring data compiled in PCS to evaluate current mill discharges. PCS was created by EPA's Office of Enforcement and Compliance Assurance to track permit, compliance, and enforcement status of facilities regulated by the NPDES program under the Clean Water Act. This system contains only permit-required monitoring data for direct-discharging facilities. As required by their permits, mills file Discharge Monitoring Reports (DMRs) with the state once a month (or at other specified frequencies). Each mill's NPDES permit specifies the pollutants to monitor and at what frequency. Pulp and paper mills that discharge to a publicly owned treatment works (POTW) or that transfer their wastewater to a private waste treater do not submit DMRs;

therefore, their data are not included in PCS. In addition, PCS typically does not include data for mills that states classify as “minor sources.”

EPA used a mainframe computer program, the Effluent Data Statistics (EDS) system, to calculate annual loads from facility DMRs. EPA estimated the toxicity of these calculated annual loads using toxic weighting factors (TWF) to calculate toxic-weighted pound equivalents (TWPE) [3] [4]. EPA multiplied the EDS-calculated annual loads by the chemical-specific TWFs to calculate the TWPE, and compiled the EDS output data, TWFs, and related information into a Microsoft Access™ database called *PCSLoads2002*. For the 2005 analysis, EPA used 2002 discharge data to be consistent with the TRI 2002 discharge data that are also used, the most recent data available from TRI at the start of the 2005 screening-level analyses. The development of the *PCSLoads2002* database and its output are described in EPA’s *2005 Screening-Level Analysis Report* [1]. Section 3.0 of this detailed study report presents the pollutant loads calculated for the Pulp and Paper Category.

The EDS mainframe computer program decision logic translates monitoring results reported as less than a detection limit (e.g., <10 pg/L) to zero lb/yr if the pollutant was never detected at the monitoring location in 2002, or an estimated mass (lb/yr) if the pollutant was detected at least once at the monitoring location in 2002. These annual load results did not provide sufficient detail to determine if Phase I mills are in compliance with their Cluster Rules-based permits. To more accurately quantify periodic monitoring results, EPA retrieved DMR-reported concentration data (after they had been converted to consistent units of measure by EDS) for all Phase I mills for 1998 through 2004.

The following activities supported EPA’s analysis of data reported to PCS:

- NCASI contacted certain facilities to discuss reported discharges and submitted findings to EPA; and
- EPA determined the operating status and rulemaking phase of facilities with data in PCS.

### *Utility and Limitations of PCS Data*

The data collected in PCS are particularly useful for the pulp and paper detailed study for the following reasons:

- PCS is national in scope, including data from all 50 states and U.S. territories; and
- Discharge reports included in PCS are based on metered flows and effluent chemical analyses and indicate if the monitored pollutants were present in concentrations above the method detection limits.

Limitations of the pulp and paper data collected in PCS include the following:

- Some states do not submit all DMR data to PCS, or do not submit the data in a timely fashion. For example, Washington State receives internal monitoring data from mills and examines the data for compliance, but does not submit the data to PCS.
- Because of the structure of the PCS database, EPA could not always identify which monitoring points represent bleach plant effluent, final effluent, or other types of discharges

Despite these limitations, EPA determined that the data summarized in *PCSLoads2002* and the PCS monthly data were usable for the detailed study review of the Pulp and Paper Category.

## **2.2        TRI**

EPA used data reported to TRI to estimate the mass of pollutants discharged by industry categories. Using the same methodology used with calculated PCS loads, EPA estimated the toxicity of these discharges using TWFs to calculate TWPE, and compiled the TRI data, TWFs, and related information into a Microsoft Access™ database called *TRIReleases2002*. For the 2005 analysis, EPA used 2002 discharge data, because they were the most recent data available from TRI when the analysis began. The development of this database



and its output are described in EPA's *2005 Screening-Level Analysis Report* [1]. Section 3.0 of this detailed study report presents the pollutant loads calculated for the Pulp and Paper Category.

As part of this detailed study, EPA verified TRI data, particularly for those facilities and pollutants with high TWPE. Facilities may estimate releases in a number of ways when reporting to TRI. If a chemical is not detected in the effluent, facilities may estimate the discharge by using one-half of the detection limit.

To verify the data reported to TRI, EPA:

- Contacted certain facilities to discuss reported discharges;
- Reviewed data submitted by NCASI; and
- Identified the operating status and rulemaking phase of facilities reporting to TRI.

#### *Utility and Limitations of TRI Data*

The data collected in TRI are particularly useful as a starting point for the detailed study for the following reasons:

- TRI includes data from all 50 states and U.S. territories;
- TRI includes releases to POTWs, not just direct discharges; and
- TRI includes releases of many chemicals, not just those limited in mill discharge permits.

Limitations of the data collected in TRI include the following:

- Small establishments (less than 10 employees) are not required to report, nor are facilities that don't meet the reporting thresholds. EPA expects that pulp and paper mills in all three regulatory phases meet the facility size reporting threshold.

- Release reports are, in part, based on estimates, not measurements, and, due to TRI guidance, may overstate releases.
- Certain chemicals (PACs, dioxin and dioxin-like compounds, metal compounds) are reported as a class, not as individual compounds. Because the individual compounds in the class have widely varying toxic effects, the potential toxicity of chemical releases can be inaccurately estimated.

Despite these limitations, EPA determined that the data summarized in *TRI Releases 2002* were useful for identifying pollutants of concern to examine further in the pulp and paper detailed study.

## **2.3            NPDES Permits**

One of the purposes of this detailed study is to evaluate how well the Cluster Rules have been incorporated into permits issued after 1998. EPA collected permits for currently operating Phase I mills and selected POTWs. POTWs receiving wastewater from Phase I mills may include effluent discharge limits that are similar to mill limits. Table 2-1 shows the number of permits collected.

**Table 2-1. Phase I Mill NPDES Permits Collected**

|  | <b>Phase I<br/>Bleached Papergrade<br/>Kraft Mills</b> | <b>Phase I<br/>Papergrade Sulfite Mills</b> | <b>POTWs Receiving Phase<br/>I Mill<br/>Wastewater</b> |
|--|--|---|--|
| <b>Number of Mills</b>                   |  |   |  |
| At promulgation (1998)                   | 84   | 11  | 10   |
| Idle or no longer in Phase I, as of 2004 | 12   | 5   | 5  |
| Operational in 2004                      | 72   | 6   | 5  |
| <b>Number of Permits Collected</b>       |  |   |  |
| Industry provided                        | 48 <sup>a</sup>  | 3 <sup>b</sup>                              | 0  |
| EPA collected                            | 16   | 3   | 4 <sup>c</sup>   |
| Total collected                          | 64   | 6   | 4 <sup>c</sup>   |
| Missing as of July 2005                  | 7 <sup>d</sup>   | 0   | 1  |

<sup>a</sup>Includes two permits that cover two mills: two Parsons & Whittemore mills (Alabama Pine Pulp and Alabama River Pulp) in Claiborne, AL, both bleached papergrade kraft mills, share a single permit; and two Domtar mills (Nekoosa -a bleached papergrade kraft mill and Port Edwards - a papergrade sulfite mill) share a permit. Includes one other permit shared by the Boise Cascade mill and the City of St. Helens POTW.

<sup>b</sup>Includes a permit shared by two Domtar mills (Nekoosa - a bleached papergrade kraft mill and Port Edwards - a papergrade sulfite mill).

<sup>c</sup>Includes one permit that both the Boise Cascade mill and the City of St. Helens POTW share.

<sup>d</sup>EPA identified a total of 71 (64 + 71) permits for 72 bleached kraft mills, because the Alabama Pine Pulp and Alabama River Pulp mills in Claiborne, share a single permit. EPA received 5 of the 7 missing permits in July 2005. Because of the late arrival of these permits, EPA did not include their analysis in this report.

AF&PA and its member companies provided the majority of the permits. EPA contacted state permitting authorities to obtain permits not readily available on the Internet and not provided by AF&PA. As of July 2005, EPA had requested, but not received, permits for seven mills and one POTW, listed in Table 2-2. After July 2005, EPA received an additional five permits. EPA's analysis of these additional permits is not included in this preliminary report, but will be included in the final report of this study.

**Table 2-2. NPDES Permits Requested, But Not Received by July 2005**

| <b>Mill</b>  | <b>Permit NPDES Number</b> | <b>POTW Receiving Phase I Mill Wastewater</b> | <b>POTW Permit NPDES</b> |
|--|----------------------------|---|--------------------------|
| Fraser Paper, Berlin <sup>a</sup>                  | NH0000655                  | -   | -                        |
| Tembec, St. Francisville <sup>a</sup>              | LA0003468                  | -   | -                        |
| S.D. Warren (SAPPI), Muskegon <sup>a</sup>         | MI0001210                  | Muskegon County Wastewater Management System  | MI0027391                |
| Lincoln Pulp & Paper Co., Lincoln,                 | ME0002003                  | -   | -                        |
| Koch Industries, New Augusta <sup>a</sup>          | MS0031704                  | -   | -                        |
| Weyerhaeuser Co., Hawesville <sup>a</sup>          | KY0001716                  | -   | -                        |
| Container Corp. of America, Brewton                | AL0002682                  | -   | -                        |
| <b>POTW Name</b>                                   | <b>Permit NPDES</b>        | <b>Mill Discharging to the POTW</b>           | <b>Mill NPDES</b>        |
| Bay County Wastewater Treatment Plant, Panama City | FL0002631                  | Smurfit Stone Container                       | FLR05B551                |

<sup>a</sup>Collected after July 2005; will be evaluated for the 2006 Plan.

## **2.4 Information Provided by Industry and Trade Associations**

EPA met with representatives from AF&PA and NCASI on April 5, 2005. Prior to the meeting, EPA sent both parties the results from its preliminary screening-level analysis of 2002 discharge data (*PCSLoads2002* and *TRIRelases2002*) and a list of questions concerning mill operating status, the incorporation of 1998 effluent guidelines, data estimation techniques, and pollutant sources. Questions and topics discussed during the meeting included explanations of screening-level review of discharge data [5].

EPA asked AF&PA and NCASI to provide information supporting the TRI-reported PACs and dioxins releases. NCASI contacted representatives from 19 mills to discuss their basis for TRI reporting, and provided this information to EPA. NCASI also provided information on nine mills reporting to PCS. In addition, NCASI also provided EPA with excerpts from a guidance document available to its members, its *Handbook of Chemical-Specific Information for SARA Section 313 Form R Reporting* [6].

### 3.0 PULP AND PAPER CATEGORY WASTEWATER POLLUTANTS

As discussed in Sections 2.1 and 2.2, EPA used its *TRIReleases2002* and *PCSLoads2002* databases to conduct a screening-level analysis of industry discharge data [1]. As it began the screening-level analysis, EPA found that the toxic and nonconventional pollutant loadings were driven by two groups of pollutants: dioxins and polycyclic aromatic compounds (PACs).

This section discusses EPA's findings on the Pulp and Paper Category in the following subsections:

- Section 3.1: Dioxins;
- Section 3.2: PACs;
- Section 3.3: *PCSLoads2002* Results; and
- Section 3.4: *TRIReleases2002* Results.

#### 3.1 Dioxins

The following discussion is excerpted from EPA's *Guidance for Reporting Toxic Chemicals within the Dioxin and Dioxin-like Compounds Category* [7], which can be found on EPA's TRI website ([http://www.epa.gov/tri/guide\\_docs/](http://www.epa.gov/tri/guide_docs/)). The term 'dioxins' refers to polychlorinated dibenzo-p-dioxins (CDDs) and polychlorinated dibenzofurans (CDFs), which constitute a group of persistent, bioaccumulative, and toxic chemicals. There are 17 CDDs and CDFs compounds which include chlorine substitution of hydrogen atoms at the 2, 3, 7, and 8 positions on the benzene rings. For 15 of these congeners, other positions are also chlorinated. The most toxic of the 17 is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Table 3-1 lists these 17 compounds, their chemical name, common abbreviated name, and EAD's toxic weighting factor (TWF) for each compound. The 17 compounds (called congeners) are referred to as 'dioxin-like,' because they have similar chemical structure, similar physical-chemical properties, and invoke a common battery of toxic responses, though the toxicity of the congeners varies greatly. For additional discussion on toxic response, see Section 4 of the *Technical Support Document for the 2004 Effluent Guidelines Program Plan* [8].

**Table 3-1. Dioxins and Their Toxic Weighting Factors**

| CAS Number  | Chemical Name                              | Abbreviated Name     | Toxic Weighting Factor <sup>1</sup> |
|-------------|--|----------------------|-------------------------------------|
| <b>CDDs</b> |  |                      |                                     |
| 1746-01-6   | 2,3,7,8-tetrachlorodibenzo-p-dioxin        | 2,3,7,8-TCDD         | 421,600,000                         |
| 40321-76-4  | 1,2,3,7,8-pentachlorodibenzo-p-dioxin      | 1,2,3,7,8-PeCDD      | 215,384,615                         |
| 39227-28-6  | 1,2,3,4,7,8-hexachlorodibenzo-p-dioxin     | 1,2,3,4,7,8-HxCDD    | 43,076,923                          |
| 57653-85-7  | 1,2,3,6,7,8-hexachlorodibenzo-p-dioxin     | 1,2,3,6,7,8-HxCDD    | 41,791,045                          |
| 19408-74-3  | 1,2,3,7,8,9-hexachlorodibenzo-p-dioxin     | 1,2,3,7,8,9-HxCDD    | 43,076,923                          |
| 35822-46-9  | 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin  | 1,2,3,4,6,7,8-HpCDD  | 4,179,104                           |
| 3268-87-9   | 1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin | 1,2,3,4,6,7,8,9-OCDD | 423,510                             |
| <b>CDFs</b> |  |                      |                                     |
| 51207-31-9  | 2,3,7,8-tetrachlorodibenzofuran            | 2,3,7,8-TCDF         | 6,696,140                           |
| 57117-41-6  | 1,2,3,7,8-pentachlorodibenzofuran          | 1,2,3,7,8-PeCDF      | 3,294,118                           |
| 57117-31-4  | 2,3,4,7,8-pentachlorodibenzofuran          | 2,3,4,7,8-PeCDF      | 32,941,176                          |
| 70648-26-9  | 1,2,3,4,7,8-hexachlorodibenzofuran         | 1,2,3,4,7,8-HxCDF    | 6,658,740                           |
| 57117-44-9  | 1,2,3,6,7,8-hexachlorodibenzofuran         | 1,2,3,6,7,8-HxCDF    | 6,666,667                           |
| 72918-21-9  | 1,2,3,7,8,9-hexachlorodibenzofuran         | 1,2,3,7,8,9-HxCDF    | 6,666,667                           |
| 60851-34-5  | 2,3,4,6,7,8-hexachlorodibenzofuran         | 2,3,4,6,7,8-HxCDF    | 6,658,740                           |
| 67562-39-4  | 1,2,3,4,6,7,8-heptachlorodibenzofuran      | 1,2,3,4,6,7,8-HpCDF  | 665,874                             |
| 55673-89-7  | 1,2,3,4,7,8,9-heptachlorodibenzofuran      | 1,2,3,4,7,8,9-HpCDF  | 666,667                             |
| 39001-02-0  | 1,2,3,4,6,7,8,9-octachlorodibenzofuran     | 1,2,3,4,6,7,8,9-OCDF | 67,367                              |

<sup>1</sup>From 2005 Screening-Level Analysis Report [1].

Beginning with reporting year 2000, facilities (including pulp and paper mills) meeting certain reporting criteria were required to report to TRI the total mass of the 17 dioxin and dioxin-like compounds released to the environment every year. (In this report, EPA uses the term “dioxins” to refer to all 17 of the 2,3,7,8-substituted CDDs and CDFs, as reported to TRI.) The TRI method of reporting the total mass of all congeners does not account for the relative toxicities of the 17 compounds. However, reporting facilities are given the opportunity to report a facility-specific congener distribution. As discussed in the *2005 Screening-Level Analysis Report* [1], EPA calculated dioxins TWPE using the TRI-reported congener distribution to estimate the mass of each congener in the facility’s reported releases to surface waters or transfers to POTWs.

If a facility did not report a congener distribution, EPA used an industry-average distribution to calculate the mass of each congener released. For the Pulp and Paper Category, EPA developed regulatory phases to prioritize mills that bleach. Because the congener distribution is more related to the bleaching process than to the product, EPA calculated the average dioxins distribution for each regulatory phase.

The Cluster Rules established ELGs for 2,3,7,8-TCDD and 2,3,7,8-TCDF, referred to as TCDD and TCDF, respectively, in this report. EPA's analytical method (Method 1613B) establishes the minimum concentration at which these compounds can be reliably quantified. The minimum level (ML) is the level at which the analytical system gives recognizable signals and an acceptable calibration point, for Method 1613B and TCDD and TCDF that level is 10 pg/L. The ELGs in the Cluster Rules for TCDD are <ML, meaning <10 pg/L. For the Bleached Papergrade Kraft and Soda Subcategory, the limitations guideline for TCDF is 31.9 pg/L.

Because of the 1998 Cluster Rules ELGs, most pulp and paper mills are typically required to monitor and report TCDD and TCDF discharges. Thus, EPA was able to identify specific congeners in PCS and use the congener-specific TWF to calculate the TWPE of the mill discharges. EPA did not need to calculate an average congener distribution for PCS discharges.

## **3.2        PACs**

PACs, sometimes known as polycyclic aromatic hydrocarbons (PAHs), are a class of organic compounds consisting of two or more fused aromatic rings. Table 3-2 lists the 21 individual compounds in the PAC category for TRI reporting, Chemical Abstract Service (CAS) number, and EPA TWF. EPA has developed TWFs for only eight of the 21 PACs.

**Table 3-2. Definition of PACs**

| <b>PAC Compound</b>               | <b>CAS Number</b> | <b>Toxic Weighting Factor</b> |
|-----------------------------------|-------------------|-------------------------------|
| Benzo(a)anthracene                | 56-55-3           | 36.2600                       |
| Benzo(a)phenanthrene (chrysene)   | 218-01-9          | 31.0100                       |
| Benzo(a)pyrene                    | 50-32-8           | 100.6600                      |
| Benzo(b)fluoranthene              | 205-99-2          | 30.6600                       |
| Benzo(j)fluoranthene              | 205-82-3          |                               |
| Benzo(k)fluoranthene              | 207-08-9          | 30.6600                       |
| Benzo(j,k)fluorene (fluoranthene) | 206-44-0          | 0.8290                        |
| Benzo(r,s,t)pentaphene            | 189-55-9          |                               |
| Dibenz(a,h)acridine               | 226-36-8          |                               |
| Dibenz(a,j)acridine               | 224-42-0          |                               |
| Dibenzo(a,h)anthracene            | 53-70-3           | 30.6600                       |
| Dibenzo(a,e)fluoranthene          | 5385-75-1         |                               |
| Dibenzo(a,e)pyrene                | 192-65-4          |                               |
| Dibenzo(a,h)pyrene                | 189-64-0          |                               |
| Dibenzo(a,l)pyrene                | 191-30-0          |                               |
| 7H-Dibenzo(e,g)carbazole          | 194-59-2          |                               |
| 7,12-Dimethylbenz(a)anthracene    | 57-97-6           |                               |
| Indeno(1,2,3-cd)pyrene            | 193-39-5          | 30.6600                       |
| 3-Methylcholanthrene              | 56-49-5           |                               |
| 5-Methylchrysene                  | 3697-24-3         |                               |
| 1-Nitropyrene                     | 5522-43-0         |                               |

PACs are likely present in petroleum products and form as the result of incomplete combustion of organic compounds. PACs and closely related compounds are major constituents of creosote, a commonly used wood preservative.

For TRI, facilities must report the combined mass of PACs released; they do not report releases of individual compounds. In the preliminary screening-level review of the 2002 TRI database, EPA assumed that all of the PACs reported released by pulp and paper mills were benzo(a)pyrene. Because benzo(a)pyrene has the highest TWF (100.66) of the PACs, this was a “worst case” assumption.



As discussed in Section 3.4.3 of the *2005 Screening-Level Analysis Report* [1], after its preliminary analysis, EPA used a different approach to estimate the TWF of PACs discharged from the Pulp and Paper Category. NCASI's TRI-reporting guidance [6] includes a table listing the concentrations of PAC compounds found in wastewaters for several types of pulping (kraft, bisulfite, chemi-thermo-mechanical, thermo-mechanical). EPA calculated the percentage of each PAC present in pulp mill wastewater based on the information provided by NCASI. EPA used this distribution to calculate an adjusted TWF for Pulp and Paper Category PACs by summing the product of each chemical's TWF and its percentage relative to the total PACs in pulp mill wastewaters. The new pulp and paper industry PAC TWF is 34.21. For more information on revisions to TWFs, see the *2005 Screening-Level Analysis Report* [1].

### **3.3            PCSLoads2002 Results**

Table 3-3 lists the 10 pollutants with the highest TWPE of PCS-reported discharges for 2002, in order of descending TWPE. The largest contributor to the category TWPE is TCDD. The table also shows the number of mills that reported discharges to PCS and, for each pollutant, the TWF, the number of mills that reported discharges, the total pounds discharged to surface waters, and the total category TWPE. The two subcategories of Phase I, Bleached Papergrade Kraft and Soda (BPK) and Papergrade Sulfite (PS), are presented separately. Phase III, although not part of this detailed study, is included to provide a perspective on the total TWPE discharged by the Pulp and Paper Category. Table 3-3 does not include pollutants for which EPA has not developed TWFs, such as BOD<sub>5</sub>, total suspended solids, color, and adsorbable organic halides (AOX). The 1998 Cluster Rules established ELGs for AOX, a bulk parameter which measures the total mass of chlorinated organic compounds. EPA has not developed a TWF for AOX because it represents a group of diverse chemicals, not a single compound.

**Table 3-3. Top 10 Pollutants in *PCSLoads2002*, Discharges by Pulp Regulatory Phase**

| Number of PCS-Reporting Facilities      |             | Phase I            |                  |                    |                  | Phase II           |                  | Phase III <sup>a</sup> |                  | Total Category   |
|---|-------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|------------------------|------------------|------------------|
|   |             | BPK ( 72 mills)    |                  | PS ( 7 mills )     |                  | 171 mills          |                  | 5 mills                |                  | 255 mills        |
| Pollutants                              | TWF         | Mills <sup>b</sup> | Discharged (lbs) | Mills <sup>b</sup> | Discharged (lbs) | Mills <sup>b</sup> | Discharged (lbs) | Mills <sup>b</sup>     | Discharged (lbs) | TWPE             |
| TCDD                                    | 703,584,000 | 71                 | 0.00194          | NR                 | NR               | 4                  | 0                | 2                      | 0                | 1,366,677        |
| Aluminum                                | 0.06469     | 11                 | 932,998          | 3                  | 15,640           | 26                 | 243,967          | 1                      | 17,160           | 78,261           |
| Chlorine <sup>c</sup>                   | 0.50916     | 20                 | 9,741            | NR                 | NR               | 43                 | 37,364           | NR                     | NR               | 23,984           |
| Sulfide                                 | 2.80        | 1                  | 2,442            | NR                 | NR               | NR                 | NR               | NR                     | NR               | 6,841            |
| Mercury                                 | 117         | 8                  | 15               | 1                  | 0                | 12                 | 40               | NR                     | NR               | 6,461            |
| Nitrite Plus Nitrate Total 1Det. (As N) | 0.00560     | 3                  | 17               | 2                  | 417,048          | 19                 | 712,322          | NR                     | NR               | 6,325            |
| Copper                                  | 0.63482     | 8                  | 674              | 4                  | 2,834            | 63                 | 3,875            | 2                      | 134              | 4,772            |
| Nitrogen, Ammonia                       | 0.00151     | 29                 | 1,620,046        | 2                  | 9,819            | 59                 | 595,331          | 2                      | 750,867          | 4,480            |
| TCDF                                    | 43,819,554  | 46                 | 0.00010          | NR                 | NR               | 4                  | 0                | NR                     | NR               | 4,395            |
| Arsenic                                 | 4.04        | 4                  | 118              | NR                 | NR               | 6                  | 771              | NR                     | NR               | 3,594            |
| <b>Total</b>                            |             |                    |                  |                    |                  |                    |                  |                        |                  | <b>1,520,479</b> |

Source: *PCSLoads2002* (these loads include the corrections to the 2002 PCS data described in Table 3-4).

BPK - Bleached Papergrade Kraft. PS - Papergrade Sulfite. NR - No mills reported discharging this parameter.

<sup>a</sup>Phase III is not in the scope of the detailed study, but discharge loads are presented to provide total category perspective.

<sup>b</sup>Number of mills monitoring the discharge of the parameter. Includes mills that never detected the parameter.

<sup>c</sup>Total Residual Chlorine.

The final effluent discharge from one mill (Bowater, Catawba SC) is responsible for all of the pulp and paper TCDD discharge. In 2002, this mill discharged 0.88 grams of TCDD, which equates to 1.37 million TWPE, or 90% of the Pulp and Paper Category's 1.52 million TWPE. Bowater reports that, since that date, neither TCDD nor TCDF has been measured in mill wastewaters above the method detection limit. The mill is enrolled in Tier 1 of EPA's VATIP and as such was provided with a six-year schedule for compliance with Cluster Rules requirements. After 2002, the Bowater Catawba mill converted to 100% chlorine dioxide bleaching and started up an advanced fiber line. See Section 4.3.1 for a more detailed description of Bowater, Catawba SC mill operations.

The preliminary results of EPA's 2005 screening-level analysis indicated that nine Phase I mills reported TCDD or TCDF discharges during 2002. As discussed in Section 2.4, NCASI contacted each of the nine mills reporting discharges, confirming for three mills that concentrations measured above analytical detection limits in 2002 were correct. NCASI identified errors for six mills in the data stored in PCS. These mills provided copies of Discharge Monitoring Reports (DMRs) and/or laboratory analytical results documenting these errors [9]. Table 3-4 summarizes EPA's review of the mill-submitted documentation. EPA changed the TCDD load for five mills in its *PCSLoads2002* database to zero pounds. EPA also changed the TCDF load for one mill to zero pounds.

**Table 3-4. Results of Review of Mill-Provided PCS Corrections**

| Facility                                  | NPDES Permit Number | Findings from Review  | Changes to <i>PCSLoads2002</i>               |
|---|---------------------|---|--|
| Pope & Talbot Inc, Halsey                 | OR0001074           | The mill provided discharge monitoring data for final effluent. Data in DMRs submitted in 2002 were below detection limit, but not labeled with "less than" or a "non-detect."            | Changed TCDD load to zero pounds discharged. |
| Weyerhaeuser, Johnsonburg                 | PA0002143           | The mill provided discharge monitoring data documenting discharges below detection for the entire year.   | Changed TCDD load to zero pounds discharged. |
| Upper Potomac River Comm STP, Westernport | MD0021687           | The POTW expressed that the "less than" sign was omitted from the DMR. A corrected DMR has been resubmitted to the state.   | Changed TCDD load to zero pounds discharged. |
| Bowater Inc Southern Division, Calhoun    | TN0002356           | The mill provided lab reports for 2002. Each dioxin and furan congener concentration reported by the lab was either not detected or estimated because it was below the calibration curve. | Changed TCDD load to zero pounds discharged. |

**Table 3-4 (Continued)**

| <b>Facility</b>                                | <b>NPDES Permit Number</b> | <b>Findings from Review</b>   | <b>Changes to PCSLoads2002</b>               |
|--|----------------------------|---|--|
| Fort James Operating Co, Wauna                 | OR0000795                  | The mill explained that the measurements reported on the DMR for October and March of 2002 were below the Cluster Rule-established minimum levels.  | Changed TCDD load to zero pounds discharged. |
| Weyerhaeuser Co, Port Wentworth Mill, Savannah | GA0002798                  | The mill explained that the laboratory reported TCDF concentrations as “laboratory estimated maximum” three times in 2002. All reported concentrations were less than Method 1613B ML (10 pg/L).  | Changed TCDF load to zero pounds discharged. |
| Bowater Inc, Catawba                           | SC0001015                  | The mill explained that the TCDD discharge was the result of a single unexplained 83.6 pg/L spike on May 13, 2002 in the final effluent. Since that date no samples have been collected above the method 1613B detection limit (10 pg/L). | No change to TCDD pounds discharged.         |
| Boise Cascade Corp., Jackson                   | AL0002755                  | The mill explained that on October 31, 2002 a TCDF concentration of 11.3 pg/L was measured in the bleach plant effluent. The measurement was below the 31.9 pg/L facility permit limit.   | No change to TCDF pounds discharged.         |
| Alabama River Pulp, Purdue Hill                | AL0025968                  | The mill explained that on December 1, 2002 a TCDF concentration of 19 pg/L was measured in the bleach plant effluent. The measurement was below the 31.9 pg/L facility permit limit.   | No change to TCDF pounds discharged.         |

Table 3-5 shows the total TWPE for each rulemaking phase. Mills with operations in the Bleached Papergrade Kraft and Soda Subcategory are responsible for the majority (95.7%) of the category TWPE. EPA recalculated the TWPE excluding the TCDD discharges from the Bowater Catawba mill. With this data exclusion, the relative contribution of the Phase II mills increases. There are more than twice as many Phase II mills as Phase I mills in the PCS database, but Phase I mill discharges contribute 58% of the category TWPE.

**Table 3-5. PCSLoads2002 TWPE by Phase, With and Without Bowater Catawba Mill TCDD Discharges**

| Number of PCS-Reporting Facilities  | Phase I         |               |                |               | Phase II   |               | Phase III  |               | Total Category |
|-------------------------------------|-----------------|---------------|----------------|---------------|------------|---------------|------------|---------------|----------------|
|                                     | BPK ( 72 mills) |               | PS ( 7 mills ) |               | 171 mills  |               | 5 mills    |               | 255 mills      |
|                                     | Total TWPE      | % of Category | Total TWPE     | % of Category | Total TWPE | % of Category | Total TWPE | % of Category | TWPE           |
| TWPE                                | 1,455,574       | 95.7          | 6,628          | 0.4           | 55,232     | 3.6           | 3,045      | 0.2           | 1,520,479      |
| TWPE excluding Bowater Catawba TCDD | 88,897          | 57.8          | 6,628          | 4.3           | 55,232     | 35.9          | 3,045      | 2.0           | 153,802        |

Source: PCSLoads2002.

BPK - Bleached Papergrade Kraft. PS - Papergrade Sulfite

EPA's classification of each Phase I mill's outfalls is presented in Appendix A of this report. Because of the difficulty in identifying which outfall data in PCS represent bleach plant effluent and which represent final effluent, a portion of the TWPE presented in Table 3-5 for the Phase I mills may represent bleach plant loads. In its Federal Register Notice of the Preliminary 2006 Effluent Guidelines Program Plan, EPA will request that operators of the mills listed in Appendix A confirm EPA's classification of its outfalls. See Section 4.3 for additional information on compliance monitoring locations.

### 3.4 TRI Releases 2002 Results

Table 3-6 lists the 10 pollutants with the highest TWPE of TRI-reported discharges for 2002, in order of descending TWPE. The largest contributor to the category TWPE is dioxins. Table 3-6 lists the number of mills that reported pollutant discharges to TRI and, for each pollutant, the TWF, the number of mills that reported discharges, the pounds discharged, and total category TWPE. Discharges include direct discharges to surface waters and transfers to POTWs. POTW transfers are included in the total discharges after POTW removals are taken into account. The two subcategories of Phase I are presented separately. Phase III, although not part of this detailed study, is included to provide a perspective on the total TWPE discharged by the Pulp and Paper Category. In addition, 21,253 TWPE was discharged by facilities in SIC codes EPA identified as "potential new subcategories." Table 3-6

does not includes releases from potential new subcategories. See Section 5 of the 2005 *Screening-Level Analysis Report* [1].

**Table 3-6. Top 10 Pollutants in *TRIReleases2002*, Releases by Regulatory Phase<sup>a</sup>**

| Number of TRI-reporting Facilities |                 | Phase I         |                |                |                | Phase II  |                | Phase III <sup>b</sup> |                | Total Category <sup>c</sup> |
|------------------------------------|-----------------|-----------------|----------------|----------------|----------------|-----------|----------------|------------------------|----------------|-----------------------------|
|                                    |                 | BPK ( 79 mills) |                | PS ( 8 mills ) |                | 169 mills |                | 5 mills                |                | 261 mills                   |
| Pollutants                         | TWF             | Mills           | Released (lbs) | Mills          | Released (lbs) | Mills     | Released (lbs) | Mills                  | Released (lbs) | TWPE                        |
| Dioxins                            | <sup>d</sup>    | 44              | 0.115          | 3              | 0.0185         | 14        | 0.013          | 4                      | 0.005          | 2,854,324                   |
| Manganese and Manganese Compounds  | 0.0144          | 70              | 3,403,539      | 2              | 32,832         | 39        | 857,936        | 4                      | 187,780        | 64,690                      |
| PACs                               | 34 <sup>e</sup> | 50              | 863            | 1              | 20.9           | 27        | 440            | 4                      | 119            | 49,355                      |
| Lead and Lead Compounds            | 2.24            | 65              | 11,876         | 6              | 841            | 114       | 16,694         | 4                      | 735            | 67,528                      |
| Chlorine                           | 0.509           | 4               | 22,682         | 1              | 3,700          | 7         | 21,357         |                        |                | 24,307                      |
| Zinc and Zinc Compounds            | 0.0469          | 46              | 228,492        | 1              | 5,751          | 24        | 73,751         | 2                      | 73,000         | 14,783                      |
| Potassium Dimethyldithiocarbamate  | 0.933           | NR              | NR             | NR             | NR             | 1         | 12,341         | NR                     | NR             | 11,519                      |
| Mercury and Mercury Compounds      | 117             | 31              | 35             | 1              | 1.7            | 41        | 24             | NR                     | NR             | 7,087                       |
| Copper and Copper Compounds        | 0.6348          | 2               | 418            | 3              | 2,121          | 5         | 1,424          | NR                     | NR             | 2,516                       |
| Vanadium and Vanadium Compounds    | 0.035           | 24              | 42,503         | 1              | 750            | 9         | 8,447          | 3                      | 2,820          | 1,908                       |
| <b>Total for All Pollutants</b>    |                 |                 |                |                |                |           |                |                        |                | <b>3,107,425</b>            |

Source: *TRIReleases2002*.

BPK - Bleached Papergrade Kraft. PS - Papergrade Sulfite. NR - None Reported

<sup>a</sup> Releases reported include both direct and indirect discharges (transfers to POTWs). Indirect discharges account for POTW removals.

<sup>b</sup> Phase III is not in the scope of the detailed study, but discharge loads are presented to provide total category perspective.

<sup>c</sup> Category total includes 21,253 TWPE discharged by facilities in SIC codes EPA identified as “potential new subcategories.” See Section 5 of the 2005 Screening-Level Analysis Report [1].

<sup>d</sup> Dioxin TWF calculated for each mill, based on reported congener distribution.

<sup>e</sup> EPA-calculated PAC TWF based on industry-submitted data [6].

Facilities in the Pulp and Paper Category reported discharges of 68.6 grams of “dioxin and dioxin-like compounds” to TRI in 2002, totaling 2.85 million TWPE. (In comparison, TCDD and TCDF discharges in PCS totaled 0.93 grams). Phase I and Phase II mills reported more than 98% of the TRI-reported discharges (2.81 million TWPE, 66.4 grams) of “dioxin and dioxin-like compounds.” Dioxins discharges account for 91% of the category TWPE. No single mill accounted for a majority of the TRI TWPE. In 2002, Bowater Catawba

reported a TRI dioxins release of 3.6 grams, which is less than 6% of the Pulp and Paper Category's total dioxins releases. (In comparison, using the TCDD discharge Bowater Catawba reported on its DMR, EPA calculated that the mill discharged 0.88 grams of TCDD in 2002, which accounted for 90% of the Pulp and Paper Category's PCS TWPE.)

For the total category, manganese and manganese compounds ranked second highest in terms of TWPE. At this time, EPA has little information on how pulp and paper mills estimate manganese releases. In its Federal Register Notice of the Preliminary 2006 Effluent Guidelines Program Plan, EPA will request additional details of methods used to estimate releases of toxic pollutant discharges reported to TRI, in particular those methods used by Phase II mills (mills without bleached papergrade kraft or papergrade sulfite operations). EPA also requests information about non-bleaching sources of toxic wastewater pollutants, such as metals and metal compounds, including manganese, lead, zinc, and mercury. EPA will continue to evaluate releases, in particular metals (manganese, lead, zinc, mercury), as it completes this detailed study.

There is some pollutant overlap between the TRI and PCS data sources. Four pollutants (dioxins, chlorine, mercury, and copper) are identified in the top 10 pollutants of concern in both databases. "Lead and lead compounds" is the only pollutant for which Phase II mill discharges exceed Phase I mill discharges.

Of the TRI-reported chemical discharges, PACs account for the third highest TWPE, comprising 1.6% of the total Pulp and Paper Category TWPE. This is a significant change from the April 5, 2005 results of EPA's screening-level analysis, which had assumed that all reported PACs were benzo(a)pyrene. Using the TWF for benzo(a)pyrene, EPA calculated that the category discharged over 140,000 TWPE of PACs. Using the TWF calculated based on PACs distribution information provided by NCASI, EPA calculated that the category discharged 49,355 TWPE of PACs, a 65% reduction.

Table 3-7 shows the total TWPE for each Phase. Unlike PCS, one pollutant (dioxins) but no single facility dominated the Pulp and Paper Category TWPE; therefore, EPA

recalculated the total TWPEs excluding dioxins reported by all mills. When dioxins are excluded from the totals, the relative contribution of the Phase II mills increases, though Phase I mills always contribute more than half of the category TWPE.

**Table 3-7. *TRIReleases2002* TWPE by Regulatory Phase, with and without Dioxins**

| Number of TRI-reporting facilities | Phase I         |               |                |               | Phase II   |               | Phase III  |               | Total Category <sup>a</sup> |
|------------------------------------|-----------------|---------------|----------------|---------------|------------|---------------|------------|---------------|-----------------------------|
|                                    | BPK ( 79 mills) |               | PS ( 8 mills ) |               | 171 mills  |               | 5 mills    |               | 261 mills                   |
|                                    | Total TWPE      | % of Category | Total TWPE     | % of Category | Total TWPE | % of Category | Total TWPE | % of Category | TWPE                        |
| TWPE                               | 1,779,702       | 57.3          | 1,127,204      | 36.3          | 143,581    | 4.6           | 56,938     | 1.8           | 3,128,678                   |
| TWPE excluding dioxins             | 139,722         | 55.2          | 6,995          | 2.8           | 97,218     | 38.4          | 9,165      | 3.6           | 253,101                     |

Source: TRIReleases2002.

<sup>a</sup> Category total includes 21,253 TWPE discharged by facilities in SIC codes EPA identified as “potential new subcategories.” See Section 5 of the 2005 Screening-Level Analysis Report [1].



## **4.0 CLUSTER RULE IMPLEMENTATION AND IMPACT**

One purpose of this detailed study is to evaluate how well the Cluster Rules effluent limitations have been incorporated into NPDES permits issued after 1998. EPA reviewed a total of 72 permits from operating Phase I mills and selected POTWs. Because Phase II and III mills are not subject to the Cluster Rules, EPA did not collect or review permits for these mills and they are not discussed in this section.

This section discusses EPA's analysis of the Cluster Rule ELGs implementation in the following subsections:

- Section 4.1: Detailed Summary of the 1998 ELGs Revisions;
- Section 4.2: Incorporation of Cluster Rules into NPDES Permits; and
- Section 4.3: Analysis of Compliance Monitoring Data.

### **4.1 Detailed Summary of 1998 ELGs Revisions (Cluster Rules)**

The Cluster Rules apply to mills with operations subject to 40 CFR Part 430 Subpart B, Bleached Papergrade Kraft and Soda, and Subpart E, Papergrade Sulfite. The Cluster Rules regulate toxic and nonconventional pollutants that are characteristic of mills that bleach chemical pulp with chlorine-containing compounds. These pollutants include adsorbable organohalides (AOX), chloroform, TCDD, TCDF, and 12 chlorinated phenolic compounds<sup>3</sup>. Permit writers issue permits that limit the discharge of these pollutants, following the Cluster Rules effluent limitations guidelines.

In addition to limiting pollutant discharges, NPDES permits establish monitoring and reporting requirements. Permits specify what discharge points must be monitored, for what pollutants, and with what frequency. Permits also specify how frequently facilities report to their permitting authority. Facility Discharge Monitoring Reports (DMRs) provide the permitting

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<sup>3</sup>4-trichlorosyringol; 3,4,5-trichlorocatechol; 3,4,6-trichlorocatechol; 3,4,5-trichloroguaiacol; 3,4,6-trichloroguaiacol; 4,5,6-trichloroguaiacol; 2,4,5-trichlorophenol; 2,4,6-trichlorophenol; tetrachlorocatechol; tetrachloroguaiacol; 2,3,4,6-tetrachlorophenol; and pentachlorophenol.

authority with the information necessary to evaluate compliance with discharge limits. Table 4-1 summarizes the required compliance points for each pollutant regulated by the Cluster Rules. EPA established less stringent monitoring requirements for mills that employ totally chlorine free (TCF) bleaching.

**Table 4-1. Compliance Points for Cluster Rules Regulated Pollutants**

| Pollutant <sup>a</sup>             | Subpart B (BPK Mills)                                |                | Subpart E (PS Mills)                                 |                            |                             |
|------------------------------------|--|----------------|--|----------------------------|-----------------------------|
|                                    | Non-TCF  | TCF            | Calcium-, Sodium-, Magnesium-Based (Segment A)       | Ammonium-Based (Segment B) | Specialty Grade (Segment C) |
| 2,3,7,8-TCDD                       | Bleach Plant   | Not required   | Not required   | Bleach Plant               | Bleach Plant                |
| 2,3,7,8-TCDF                       | Bleach Plant   | Not required   | Not required   | Bleach Plant               | Bleach Plant                |
| Chloroform                         | Bleach Plant   | Not required   | Not required   | Reserved                   | Reserved                    |
| 12 chlorinated phenolic pollutants | Bleach Plant   | Not required   | Not required   | Bleach Plant               | Bleach Plant                |
| AOX                                | Final Effluent (Directs)<br>Bleach Plant (Indirects) | Final Effluent | Final Effluent (Directs)<br>Bleach Plant (Indirects) | Reserved                   | Reserved                    |
| COD                                | Reserved   | Reserved       | Reserved   | Reserved                   | Reserved                    |

Source: Permit writers guidance document.

BPK - Bleached Papergrade Kraft. PS - Papergrade Sulfite. TCF - Totally Chlorine Free.

<sup>a</sup>Table 4-1 presents monitoring locations information for Cluster Rules Pollutants. All Phase I mills must also monitor and comply with BPT/BCT limits for pH, BOD<sub>5</sub> and TSS at the final effluent. If they have not certified that they do not use chlorophenolic-containing biocides, they must also monitor and comply with BAT limits for trichlorophenol and pentachlorophenol at the final effluent.

Mills are required to demonstrate compliance at the following two locations:

- The point where wastewater leaves the bleach plant, before being combined with process wastewaters or noncontact cooling water from other operations prior to treatment and discharge. Hereafter, this sample location is referred to as “bleach plant.”
- The point where mills discharge their treated effluent to the receiving streams; hereafter referred to as “final effluent.”

Each mill with operations subject to Subpart B (hereafter, bleached kraft mills) must demonstrate compliance with the limits for TCDD, TCDF, 12 chlorinated phenolic pollutants, and chloroform in the effluent from the bleach plant of each individual fiber line.

Chemical pulp bleaching is the principal source of these pollutants. EPA determined that bleach plant limits for chloroform are necessary because there is potential for its volatilization and loss in mill sewer systems. EPA determined that bleach plant limits are necessary for the other pollutants because they are generated at very low concentrations and may be diluted to below analytical detection limits when combined with other mill wastewaters. Indirect discharging mills must also comply with an AOX limit at the bleach plant, while direct discharging mills are required to monitor for AOX at the final effluent.

The limitations and monitoring requirements for mills with operations subject to Subpart E (hereafter, papergrade sulfite mills) depend on the pulping base used at the mill. EPA divided the Papergrade Sulfite Subcategory into three segments, listed in Table 4-1. Papergrade sulfite mills in Segment A are required to monitor for only AOX, while mills in Segments B and C are required to monitor for TCDD, TCDF, and the 12 chlorinated phenolic compounds, but not AOX.

#### **4.1.1 Best Available Technology and Pretreatment Standards**

The Cluster Rules require that mills existing as of April 15, 1998 that discharge directly to receiving streams control toxic and nonconventional pollutants at the best available technology (BAT) economically achievable level of performance. EPA established Pretreatment Standards for Existing Sources (PSES) that are based on control technologies similar to BAT for indirect dischargers. As shown in Table 4-2, except for the monitoring location for AOX, the Subpart B BAT limitations guidelines and PSES for indirect dischargers are the same. EPA promulgated regulations for new sources (New Source Performance Standards, for direct dischargers, and Pretreatment Standards for New Sources, for indirect dischargers). However no new bleached kraft or papergrade sulfite mills have been constructed since 1998.

**Table 4-2. Subpart B (Bleached Papergrade Kraft and Soda) BAT Effluent Limitations Guidelines and Pretreatment Standards for Existing Sources**

| Pollutants  | 1-Day Maximum <sup>a</sup>     |
|---|--------------------------------|
| <b>Bleach Plant Effluent</b>  |                                |
| TCDD  | <ML (b)                        |
| TCDF  | 31.9 pg/l                      |
| Chloroform  | 1-Day Maximum: 6.92 g/kg (c)   |
|   | Monthly Average: 4.14 g/kg (c) |
| Trichlorosyringol   | <ML(a)                         |
| 3,4,5-Trichlorocatechol   | <ML(a)                         |
| 3,4,6-Trichlorocatechol   | <ML(a)                         |
| 3,4,5-Trichloroguaiacol   | <ML(a)                         |
| 3,4,6-Trichloroguaiacol   | <ML(a)                         |
| 4,5,6-Trichloroguaiacol   | <ML(a)                         |
| 2,4,5-Trichlorophenol   | <ML(a)                         |
| 2,4,6-Trichlorophenol   | <ML(a)                         |
| Tetrachlorocatechol   | <ML(a)                         |
| Tetrachloroguaiacol   | <ML(a)                         |
| 2,3,4,6-Tetrachlorophenol   | <ML(a)                         |
| Pentachlorophenol   | <ML(a)                         |
| <b>Final Effluent (for BAT) or Bleach Plant Effluent (for PSES)</b> |                                |
| AOX   | 1-Day Maximum: 0.951 kg/kg     |
|   | Monthly Average: 0.623 kg/kg   |

<sup>a</sup>EPA established monthly average limitations guidelines for only chloroform and AOX.

<sup>b</sup> <ML means less than the minimum level at which the analytical system gives recognizable signals and an acceptable calibration point. The MLs for each pollutant are specified in 40 CFR 430.01(i).

<sup>c</sup>For mills that certify to use TCF, refer to 40 CFR 430.24(a)(2).

Table 4-3 presents the Subpart E BAT limitations guidelines and PSES for papergrade sulfite mills. Regulations for Segment C are not presented because no mills with operations in Segment C are currently operating in the United States.

**Table 4-3. Subpart E (Papergrade Sulfite) BAT Effluent Limitations Guidelines and Pretreatment Standards for Existing Sources**

| Pollutants  | Segment A<br>Calcium, Magnesium, and<br>Sodium Sulfite <sup>a</sup> | Segment B<br>Ammonium Sulfite |
|---|---|-------------------------------|
| <b>Bleach Plant Effluent</b>  |   |                               |
| TCDD  | not regulated   | <ML                           |
| TCDF  | not regulated   | <ML                           |
| Chloroform  | not regulated   | reserved                      |
| Trichlorosyringol   | not regulated   | <ML                           |
| 3,4,5-Trichlorocatechol   | not regulated   | <ML                           |
| 3,4,6-Trichlorocatechol   | not regulated   | <ML                           |
| 3,4,5-Trichloroguaiacol   | not regulated   | <ML                           |
| 3,4,6-Trichloroguaiacol   | not regulated   | <ML                           |
| 4,5,6-Trichloroguaiacol   | not regulated   | <ML                           |
| 2,4,5-Trichlorophenol   | not regulated   | <ML                           |
| 2,4,6-Trichlorophenol   | not regulated   | <ML                           |
| Tetrachlorocatechol   | not regulated   | <ML                           |
| Tetrachloroguaiacol   | not regulated   | <ML                           |
| 2,3,4,6-Tetrachlorophenol   | not regulated   | <ML                           |
| Pentachlorophenol   | not regulated   | <ML                           |
| <b>Final Effluent (for BAT) or Bleach Plant Effluent (for PSES)</b> |   |                               |
| AOX   | 1-Day Maximum: 2.64 kg/kg   | reserved                      |
|   | Monthly Average: 1.41 kg/kg   | reserved                      |

<ML means less than the minimum level at which the analytical system gives recognizable signals and an acceptable calibration point. The MLs for each pollutant are specified in 40 CFR 430.01(i).

<sup>a</sup>EPA established monthly average limitations guidelines for only chloroform and AOX.

<sup>b</sup>For mills that certify to use TCF, refer to 40 CFR 430.24(a)(2).

#### 4.1.2 VATIP and Limits for TCF Mills

As part of the Cluster Rules promulgated in 1998, EPA established the Voluntary Advanced Technology Incentives Program (VATIP) to encourage existing and new direct dischargers subject to Subpart B to reduce pollutant discharges by implementing advanced pollution prevention controls. No comparable program was established for mills subject to Subpart E or for indirect dischargers. By enrolling in VATIP, mills receive additional time to comply with the rule (six or more years, depending on the selected tier), reduced monitoring requirements, and public recognition. EPA established three tiers of Advanced Technology

performance requirements, each with increasingly more effective levels of environmental protection.

Totally chlorine free (TCF) bleaching is performed without using chlorine, sodium or calcium hypochlorite, chlorine dioxide, chlorine monoxide, or any other chlorine-containing compound. Each fiber line that uses exclusively TCF bleaching processes is required only to comply with final effluent AOX limitations; no bleach plant limits are required.

One bleached kraft mill (Weyerhaeuser in Oglethorpe, GA) participates in EPA's Project XL, which stands for "eXcellence and Leadership." This national pilot program allows state and local governments, businesses, and federal facilities to work with EPA to develop more cost-effective, strategies for achieving environmental and public health protection. In exchange, EPA offers regulatory, program, policy, or procedural flexibility to conduct the program.

Table 4-4 lists the bleached kraft mills participating in these beyond compliance programs.

**Table 4-4. Bleached Kraft Mills Operating Beyond Compliance**

|  | NPDES Permit Number | Beyond Compliance Program |
|--|---------------------|---------------------------|
| <b>VATIP Mills</b>   |                     |                           |
| International Paper, Eastover                              | SC0038121           | VATIP; Tier 1             |
| Bowater Inc., Catawba                                      | SC0001015           | VATIP; Tier 1             |
| Glatfelter, Spring Grove                                   | PA0008869           | VATIP; Tier 1             |
| International Paper, Franklin                              | VA0004162           | VATIP <sup>a</sup>        |
| <b>XL Mill</b>   |                     |                           |
| Weyerhaeuser/Flint River Mill, Oglethorpe                  | GA0049336           | XL                        |
| <b>TCF Bleaching Mill</b>                                  |                     |                           |
| Evergreen Pulp Company (formerly Louisiana-Pacific), Samoa | CA0005894           | TCF                       |

VATIP - Voluntary Advanced Technology Incentives Program. XL - eXcellence and Leadership. TCF - Totally Chlorine Free.

<sup>a</sup>Permit does not indicate VATIP Tier, believed to be Tier 1.

### 4.1.3 Support Documents

EPA's supporting documents that describe the development and implementation of the Cluster Rules ELGs explain in more detail the regulations reviewed in this section. These documents, listed below, can be found at the EPA website

<http://epa.gov/waterscience/pulppaper/>.

- *Supplemental Technical Development Document for Effluent Limitations Guidelines and Standards for the Pulp, Paper, and Paperboard Category: Subpart B [Bleached Papergrade Kraft and Soda] and Subpart E [Papergrade Sulfite].* EPA-821-R-97-011. October 1997.
- *Technical Support Document for the Voluntary Advanced Technology Incentives Program,* November, 1997.
- *Technical Support Document for Best Management Practices for Spent Pulping Liquor Management, Spill Prevention, and Control.* October 1997.
- *Permit Guidance Document for the Pulp, Paper, and Paperboard Manufacturing Point Source Category (40 CFR 430).* EPA-821-B-00-003. May 2000.

## 4.2 Incorporation of Cluster Rules into NPDES Permits

EPA reviewed permits to determine if the appropriate Cluster Rules monitoring requirements were included. Permits are issued to facilities for a specific time period (generally five years) with a requirement to reapply prior to the expiration date. Permit writers are required to use the Cluster Rules guidelines for permits issued after April 15, 1998. Thus, all permits for affected mills should have had limits and monitoring requirements based on the new guidelines by April 2003, unless permit renewal has been delayed or the mill was enrolled in the VATIP.

This subsection presents EPA's review of permits issued for bleached kraft mills, POTWs receiving bleached kraft mill wastewater, and papergrade sulfite mills.

#### 4.2.1 Bleached Papergrade Kraft Mills

At the time the Cluster Rules were promulgated, 84 bleached kraft mills operated in the United States. As of 2004, 72 mills continue to have bleached kraft operations. These mills are listed in Appendix B to this report. The total includes one TCF mill, Evergreen Pulp Company (formerly Louisiana Pacific) in Samoa, CA (which produces a chlorine-free product using peroxide bleach), five mills operating in beyond-compliance programs, four indirect discharging mills subject to PSES, and two mills that share a permit. EPA reviewed 64 permits for these bleached kraft mills to determine if the appropriate Cluster Rules monitoring requirements were included.

Table 4-5 presents the number of permits for bleached kraft mills that are missing Cluster Rules monitoring requirements for AOX, TCDD, TCDF, chloroform and chlorinated phenolic compounds. As shown in the table, permits for 15 mills permits have expired. However, expired NPDES permits remain in effect until the new permit is issued, as long as a complete application for permit renewal was submitted before the expiration date. EPA assumes that these mills have submitted applications to the appropriate permitting authority and that the expired permits remain in effect.

**Table 4-5. Number of Permits for Bleached Kraft Mills Missing Cluster Rules Monitoring Requirements**

|  | Permits Collected | Permit Has Expired | Pollutant Missing Required Monitoring |  |                                |
|--|-------------------|--------------------|---------------------------------------|--|--------------------------------|
|  |                   |                    | AOX                                   | TCDD, TCDF, and chloroform                   | Chlorinated Phenolic Compounds |
| BPK mills, direct discharges not listed below <sup>a</sup> | 54                | 13/54              | 4/54                                  | TCDD: 8/54<br>TCDF: 9/54<br>Chloroform: 9/54 | 9/54                           |
| BPK mills, indirect dischargers                            | 3                 | 1/3                | 2/3                                   | 1/3  | 1/3                            |
| BPK mills, beyond compliance (VATIP)                       | 4                 | 1/4                | 0/4                                   | 0/4  | 0/4                            |
| Domtar Mill - WI <sup>b</sup>                              | 1                 | 0/1                | 0/1                                   | 0/1  | 0/1                            |
| Boise Cascade - OR <sup>c</sup>                            | 1                 | 0/1                | 0/1                                   | 0/1  | 0/1                            |
| Evergreen Pulp Co. (BPK TCF)                               | 1                 | 0/1                | 0/1                                   | 0/1 <sup>d</sup>                             | 0/1 <sup>d</sup>               |



**Table 4-5 (Continued)**

|              | Permits Collected | Permit Has Expired | Pollutant Missing Required Monitoring |                            |                                |
|--------------|-------------------|--------------------|---------------------------------------|----------------------------|--------------------------------|
|              |                   |                    | AOX                                   | TCDD, TCDF, and chloroform | Chlorinated Phenolic Compounds |
| <b>Total</b> | <b>64</b>         | <b>15</b>          | <b>6</b>                              | <b>9</b>                   | <b>10</b>                      |

NOTE: EPA assumes that expired permits remain legally binding.

BPK - Bleached Papergrade Kraft. VATIP - Voluntary Advanced Technology Incentives Program. TCF - Totally Chlorine Free.

<sup>a</sup>Includes minor discharger Weyerhaeuser/Flint River Mill in Oglethorpe, GA and the two Parsons & Whittemore mills (Alabama Pine Pulp/Alabama River Pulp) in Claiborne, AL covered under a single permit.

<sup>b</sup>Includes the Domtar Mill in Port Edwards, WI (papergrade sulfite), which shares its discharge with the Domtar Mill in Nekoosa, WI (bleached kraft).

<sup>c</sup>Includes the Boise Cascade bleached kraft mill and The City of St. Helens POTW, which share a permit.

<sup>d</sup>Although not required by the Cluster Rules, the permit for this TCF mill includes specific limits for these pollutants.

Permits for 12 mills (10 direct dischargers and two indirect dischargers) do not include all Cluster Rules limits and monitoring requirements. These mills are listed Tables 4-6. The majority of these permits have expired (9 of 12). Of the permits that do not include all Cluster Rule-required monitoring, four were issued after the April 1998 Cluster Rules promulgation date. EPA will request additional information for these mills from the state permitting authorities to learn why Cluster Rules monitoring requirements are missing.

The Cluster Rules require mills to monitor for TCDD and chlorinated phenolic compounds at the bleach plant. Table 4-6 shows that several permits improperly specify final effluent as the compliance monitoring point.

**Table 4-6. Permits for Bleached Kraft Mills Missing Required Bleach Plant Monitoring**

| Mill                                | NPDES Permit Number | Active Permit Expires | Pollutant Absent from Required Monitoring | Pollutant Limited at FE not BP |
|-------------------------------------|---------------------|-----------------------|---|--------------------------------|
| <b>Direct Discharge</b>             |                     |                       |   |                                |
| International Paper Co., Cantonment | FL0002526           | 8/31/95               | TCDD, TCDF, chloroform, CP                | -                              |
| International Paper, Jay            | ME0001937           | 3/1/99                | TCDD, TCDF, chloroform, CP                | TCDD, TCDF                     |
| New Page, Rumford                   | ME0002054           | 3/30/97               | TCDD, TCDF, chloroform, CP                | TCDD                           |

**Table 4-6 (Continued)**

| <b>Mill</b>                            | <b>NPDES Permit Number</b> | <b>Active Permit Expires</b> | <b>Pollutant Absent from Required Monitoring</b> | <b>Pollutant Limited at FE not BP</b> |
|--|----------------------------|------------------------------|--|---------------------------------------|
| Weyerhaeuser Paper Co., Plymouth       | NC0000680                  | 5/31/02                      | TCDD, TCDF, chloroform, CP                       | TCDD                                  |
| International Paper Co., Riegelwood    | NC0003298                  | 11/30/01                     | TCDD, TCDF, chloroform, CP                       | TCDD, CP                              |
| Pope & Talbot Inc., Halsey             | OR0001074                  | 7/1/98                       | CP, chloroform                                   | -                                     |
| Georgia-Pacific, Port Hudson , Zachary | LA0005258                  | 1/1/07                       | TCDD, TCDF, chloroform, CP                       | TCDD, TCDF, CP, Chloroform            |
| New Page, Chillicothe                  | OH0004481                  | 1/31/09                      | TCDF   | -                                     |
| Weyerhaeuser, Oglethorpe               | GA0049336                  | 7/30/02                      | TCDD, TCDF, chloroform, CP                       | TCDD                                  |
| International Paper Co., Texarkana     | TX0000167                  | 1/1/01                       | TCDD, TCDF, chloroform, CP                       | TCDD                                  |
| <b>Indirect Discharge</b>              |                            |                              |  |                                       |
| New Page, Luke                         | MD0001422                  | 4/30/06                      | AOX  | AOX                                   |
| Sappi Fine Paper, Cloquet              | MN0001431                  | 11/30/96                     | AOX, TCDD, TCDF, chloroform, CP                  | -                                     |

CP - Chlorinated phenolic compounds.

BP - Bleach Plant.

FE - Final Effluent.

Active permits from the four bleached kraft mills listed in Table 4-7 have no AOX monitoring requirement. Each of these permits has expired and has not been reissued since promulgation of the Cluster Rules. Even though the permit for the MeadWestvaco (New Page) Mill in Rumford, ME reviewed for this study has no AOX limits, the PCS database contains AOX discharge data at the final effluent for the mill. EPA contacted Maine and Florida and confirmed that the permits listed in Table 4-7 are the current active permits. EPA will contact North Carolina to confirm that the two permits for North Carolina mills listed in Table are the current active permits.

**Table 4-7. Permits for Bleached Kraft Mills Missing Required Final Effluent AOX Monitoring**

| Mill                                | NPDES Permit Number    | Active Permit Expires |
|-------------------------------------|------------------------|-----------------------|
| International Paper Co, Cantonment  | FL0002526              | 8/31/95               |
| MeadWestvaco (New Page), Rumford    | ME0002054 <sup>a</sup> | 3/30/97               |
| Weyerhaeuser Paper Co., Plymouth    | NC0000680              | 5/31/02               |
| International Paper Co., Riegelwood | NC0003298              | 11/30/01              |

<sup>a</sup>Mill has AOX discharge loads in PCS from 1997 through 2004.

#### **4.2.2 POTWs**

EPA reviewed permits for three POTWs that receive bleached kraft mill wastewater. The Cluster Rules do not include ELGs for POTWs that receive Phase I pulp mill wastewater. Instead, permit limits for Cluster Rules pollutants for POTWs are determined by water quality standards and the professional judgment of the permit writer based on the types of industrial wastewater received. Each permit EPA reviewed was issued in the past five years and included TCDD limits at the final effluent. One permit, for the Western Lake Superior Sanitary District POTW in Duluth MN, includes a chloroform final effluent monitoring requirement. Only the permit for Upper Potomac River Commission POTW in Westernport, MD includes limits for the pulp mill bleach plant discharges.

#### **4.2.3 Papergrade Sulfite Mills**

At the time the Cluster Rules were promulgated, 11 papergrade sulfite mills operated in the United States. As of 2004, only six of these mills still had sulfite operations and all were direct dischargers. Table 4-8 lists these mills, their NPDES permit number, and the segment of the Subpart E regulations that applies to their discharges. None of the operating papergrade sulfite mills produce speciality grade pulp (Segment C).

**Table 4-8. Operating Papergrade Sulfite Mills**

| Mill Name                          | NPDES Permit           | Segment                                   |
|------------------------------------|------------------------|---|
| Wausau Mosinee Paper Mills, Brokaw | WI0003379              | A (calcium, magnesium, or sodium sulfite) |
| Weyerhaeuser Paper Co., Rothschild | WI0026042              | A (calcium, magnesium, or sodium sulfite) |
| Fraser Paper, Park Falls           | WI0003212              | A (calcium, magnesium, or sodium sulfite) |
| Domtar, Port Edwards               | WI0003620 <sup>a</sup> | A (calcium, magnesium, or sodium sulfite) |
| Kimberly-Clark, Everett            | WA0000621              | B (ammonium sulfite)                      |
| Finch Pruyn & Co Inc., Great Falls | NY0005525              | B (ammonium sulfite)                      |

Segment A - Applies to mills that produce pulp using calcium, magnesium, or sodium sulfite acidic cooking liquors.

Segment B - Applies to mills that produce pulp using an ammonium sulfite acidic liquor.

<sup>a</sup>Two Domtar mills (Nekoosa - BPK mill & Port Edwards - a PS mill) share a NPDES permit.

The six operating papergrade sulfite mills include one facility that is counted in both Subparts B and E. The Domtar Port Edwards Mill produces bleached magnesium-based sulfite pulp (Segment A) and has been totally chlorine free since 1993.

Permits for papergrade sulfite mills with operations in Segment A (calcium-, magnesium-, and sodium-based sulfite) should have AOX limits and monitoring at the final effluent. Permits for papergrade sulfite mills with operations in Segment B (ammonium-based sulfite) should have limits for TCDD, TCDF, and 12 chlorinated phenolic pollutants at the bleach plant effluent from each individual fiber line. Permits for the two Segment B mills also include bleach plant chloroform monitoring requirements, even though the Cluster Rules did not. Table 4-9 presents the number of permits for papergrade sulfite mills that do not include Cluster Rule monitoring requirements. Both permits for the two operating Segment B mills include the Cluster Rule requirements.

**Table 4-9. Number of Permits for Papergrade Sulfite Mills Missing Cluster Rules Monitoring Requirements**

| Segment                                   | Permits Collected | Permit Expired | Required Monitoring Missing <sup>a</sup> |                       |                       |                       |
|---|-------------------|----------------|--|-----------------------|-----------------------|-----------------------|
|   |                   |                | FE-AOX                                   | BP-TCDF               | BP-TCDD               | BP-CP                 |
| A - calcium, magnesium, or sodium sulfite | 3                 | 0/3            | 3/3<br>(Final Effluent)                  | Not required          | Not required          | Not required          |
| B - ammonium sulfite                      | 2                 | 0/2            | Reserved                                 | 0/2<br>(Bleach Plant) | 0/2<br>(Bleach Plant) | 0/2<br>(Bleach Plant) |
| Total                                     | 5                 | 0              | 3  | 0                     | 0                     | 0                     |

BP = Bleach Plant      FE = Final Effluent      CP = Chlorinated Phenolic Compounds

<sup>a</sup>No active PS mills are indirect dischargers or in the specialty grade segment.

None of the permits for the three mills with operations in Segment A (calcium, magnesium, or sodium sulfite) include required final effluent AOX monitoring. All three mills are located in Wisconsin. EPA plans to contact the Wisconsin NPDES permitting authority to discuss the AOX monitoring requirements. The PCS database contained no report AOX loads for the Segment A mill during the study period, 1998 through 2004.

### **4.3      Analysis of Compliance Monitoring Data**

EPA compared PCS data to the Cluster Rules ELGs. For this review, EPA compiled data for the period 1998, when the Cluster Rules were promulgated, through 2004, the most recent full year for which PCS data were available. For pollutants with concentration-based guidelines (TCDD, TCDF, and the chlorinated phenolic compounds), EPA determined if the mill was meeting the guidelines by examining PCS-reported concentrations. EPA could not determine if the mill was meeting the guidelines for pollutants with mass-based guidelines (chloroform and AOX), because PCS does not include production information. For these pollutants, EPA evaluated the effectiveness of the ELGs in reducing pollutant discharges by comparing the baseline pollutant load estimated during the development of the guidelines to the discharge load calculated using PCS data. As part of the Cluster Rules development, EPA estimated baseline pollutant loads for each mill. Because EPA did not have data from each mill subject to Subpart B or E, EPA modeled baseline discharges for each mill, based on the

operations in use and pulp production as of mid-1995. Hereafter, these production-normalized loads are referred to as “baseline loads.”

As discussed in Section 4.2, the Cluster Rules require monitoring for certain pollutants at the bleach plant and for other pollutants at the final effluent. However, because the descriptions of monitoring locations in PCS are incomplete, EPA could not always identify which locations were bleach plant effluent and which were final effluent. For this reason, EPA reviewed additional information from mill permits and communication with the mills to identify the outfalls as bleach plant effluent, final effluent, or other outfalls not regulated by the Cluster Rules (e.g., noncontact cooling water or stormwater runoff). EPA's classification of each Phase I mill's outfalls is presented in Appendix A to this report.

#### **4.3.1 Bleached Papergrade Kraft**

EPA collected and reviewed 64 NPDES permits for bleached kraft mills. Although most of the permits included limits based on the Cluster Rules ELGs, monitoring data for many of the regulated pollutants was missing from PCS. Table 4-10 lists, for each of the Cluster Rules pollutants, the number of bleached kraft mills for which EPA found permit limits and the number of mills for which it identified 2004 monitoring data in PCS. Table 4-10 also shows, for the mills with monitoring data in PCS, the number for which EPA did not find permit limits and the number for which it has not yet reviewed permits.

For example, EPA found that permits for 53 direct discharging bleached kraft mills included requirements for monitoring TCDD at the bleach plant, as required by the Cluster Rules. However, EPA identified bleach plant TCDD monitoring data in PCS for only 41 mills. Of these mills, one had no permit requirements for TCDD bleach plant monitoring and EPA has not yet reviewed the permits for five mills. Thus, of the 53 mills with required TCDD monitoring, EPA identified data in PCS for only 35, and data for 18 mills (53 - 35) were missing from PCS.

**Table 4-10. Comparison of Permit-Required Monitoring and Monitoring Data in PCS, for Direct Discharge Bleached Kraft Mills**

|                                   | Number of Mills With Permits that Include Cluster Rules Monitoring <sup>a</sup> | Number of Mills With 2004 Data in PCS |                  |                              | Number of Mills with Permit limits but no data in PCS |
|-----------------------------------|---|---------------------------------------|------------------|------------------------------|---|
|                                   |   | Total Mills Monitoring                | No permit limits | Mill permit not yet reviewed |   |
| Bleach Plant                      |   |                                       |                  |                              |   |
| TCDD                              | 53  | 41                                    | 1                | 5                            | 18  |
| TCDF                              | 52  | 42                                    | 2                | 5                            | 17  |
| Any Chlorinated Phenolic Compound | 52  | 40 <sup>b</sup>                       | 1                | 4                            | 17  |
| Chloroform                        | 52  | 28 <sup>b</sup>                       | 1                | 3                            | 28  |
| Final Effluent                    |   |                                       |                  |                              |   |
| AOX                               | 57  | 37 <sup>b</sup>                       | 1                | 5                            | 26  |

<sup>a</sup>Excludes indirect dischargers because their monitoring data is not typically reported to PCS.

<sup>b</sup>Two Parsons & Whittemore mills (Alabama Pine Pulp and Alabama River Pulp) share a permit and their monitoring data are reported to PCS as a single facility; and counted as one reporting mill in this table.

Table 4-11 presents the number of bleached kraft mills with permit limits and no data in PCS. The table also presents EPA's understanding, at this time, of why permit-required monitoring data are missing from PCS. Washington State does not upload in-plant monitoring data to PCS, which accounts for the TCDD, TCDF, chlorinated phenolic compounds, and chloroform in-plant monitoring data missing for four mills. See Section 4.3.3 for more discussion of the Washington State monitoring data. In addition, one TCF mill has bleach plant limits, but is not required to monitor. EPA has no explanation for why most of the permit-required monitoring data are missing from PCS.

EPA noticed, however, that discharges of some of the Cluster Rules pollutants are reported to PCS at a monitoring location inconsistent with ELGs compliance points. During this study, EPA may have incorrectly identified the bleach plant monitoring location as final effluent or it may be incorrectly identified in PCS. In its Federal Register Notice of the Preliminary 2006 Effluent Guidelines Program Plan, EPA will request that operators confirm EPA's classification of outfalls listed in Appendix A.

**Table 4-11. Number of Bleached Kraft Mills With Permit Limits but No Data in PCS and Why Data are Missing**

|   | TCDD | TCDF | Any Chlorinated Phenolic Compound | Chloroform | AOX |
|---|------|------|-----------------------------------|------------|-----|
| Data Not Expected in PCS (i.e., Not Required at TCF Mill)   | 1    | 1    | 1                                 | 1          |     |
| State Does Not Upload In-Plant Monitoring to PCS            | 4    | 4    | 4                                 | 4          |     |
| Reason for No Data in PCS Unknown                           | 13   | 12   | 12                                | 23         | 26  |
| Total Number of Mills With Permit Limits but No Data in PCS | 18   | 17   | 17                                | 28         | 26  |

### **Bleach Plant TCDD and TCDF**

Table 4-12 presents the number of mills monitoring TCDD and TCDF at the bleach plant and the final effluent over the period 1998 to 2004. Too few detectable concentrations were available to conduct a trend analysis on the basis of calculated mass (grams/year) discharged. As an alternative, EPA counted the number of mills monitoring for TCDD and TCDF and the number detecting these pollutants at concentrations above analytical detection limits. Because many mills have more than one bleach plant, for this analysis, EPA counted the number of mills that monitor bleach plant effluent, not the number of bleach plants.

**Table 4-12. Number of Mills Reporting TCDD and TCDF Monitoring Data to PCS, 1998 through 2004**

|                | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Stopped monitoring between 1998 and 2004 |
|----------------|------|------|------|------|------|------|------|--|
| TCDD at BP     | 11   | 14   | 18   | 24   | 31   | 34   | 41   | 13                                       |
| TCDD at FE     | 33   | 34   | 34   | 34   | 30   | 32   | 30   |  |
| TCDD at either | 41   | 44   | 45   | 45   | 47   | 50   | 52   | 3  |
| TCDF at BP     | 2    | 5    | 9    | 20   | 30   | 34   | 42   | 6  |
| TCDF at FE     | 14   | 15   | 15   | 15   | 14   | 13   | 12   |  |
| TCDF at either | 14   | 17   | 19   | 29   | 38   | 42   | 49   |  |

FE - Final effluent.

BP - Bleach plant, internal monitoring location.



Table 4-12 shows two trends are occurring with respect to TCDD bleach plant monitoring. Significantly more mills monitored for these pollutants in 2004 than in 1998. During that same period, 13 mills stopped monitoring; however, in all cases, the mills stopped monitoring when they were issued a new permit. Trends in mill TCDF monitoring follow a similar pattern. Final effluent monitoring for TCDD or TCDF is not required by the Cluster Rules, although it may be necessary to ensure compliance with state water-quality standards.

For the mills that report discharges to PCS in 2002, EPA estimated the 1995 baseline loads of TCDD and TCDF were 17.9 million TWPE. In 2002, TCDD and TCDF discharges from these mills accounted for only 1.3 million TWPE, a 92% reduction from baseline. By 2004, TCDD and TCDF discharges were only 26,493 TWPE, more than 99% reduction from the 1995 baseline.

Monthly data for two mills (International Paper in Pine Bluff, AR and Boise Cascade in St. Helens, OR) were unavailable for the analysis described in this preliminary report because they were not properly identified as pulp mills when the EDS system compiled monitoring data from PCS. *PCSLoads2002* contained calculated loads of 0 lb/yr TCDD for those two mills at the final effluent and bleach plant monitoring locations. Data from these mills is excluded from Section 4.3 tables and analysis, but will be included in the final report of this study that will be prepared in support of EPA's 2006 Effluent Guidelines Program Plan.

Table 4-13 presents the concentrations of TCDD and TCDF detected in wastewaters from 15 bleached kraft mills during the period 2001 through 2004. These concentrations include the corrections to the 2002 PCS data described in Section 3.3. All other measurements included in PCS for this time period were reported as less than the detection limit. The table includes several measured concentrations that are less than the minimum level (ML) for Method 1613B (10 pg/L). Measurements below or equal to the ML demonstrate compliance with the Cluster Rules-based permit limits.

**Table 4-13. Concentration of TCDD and TCDF Detected in Bleached Papergrade Kraft Mill Wastewaters (pg/L)**

| Mill<br>(NPDES Permit Number)  | Location           | 2001                    | 2002 <sup>a</sup>   | 2003                      | 2004                      |
|--|--------------------|-------------------------|---------------------|---------------------------|---------------------------|
| <b>TCDD Detects</b>  |                    |                         |                     |                           |                           |
| Bowater, Catawba<br>(SC0001015)  | FE                 |                         | 83.6<br>(confirmed) | 5.2 <sup>b</sup>          |                           |
| Weyerhaeuser, Johnsonburg<br>(PA0002143)                                   | other <sup>c</sup> | 1.7 - 28.9 <sup>d</sup> | 0<br>(corrected)    |                           |                           |
| Upper Potomac River<br>Commission, Westernport<br>(MD0021687) <sup>c</sup> | FE                 |                         | 0<br>(corrected)    |                           | 10                        |
| Georgia-Pacific, Brunswick<br>(GA0003654)                                  | FE                 |                         |                     | 10                        |                           |
| Westvaco, Wickliffe<br>(KY0000086)   | BP                 |                         |                     | 10                        |                           |
| Bowater, Calhoun<br>(TN0002356)  | BP                 |                         | 0<br>(corrected)    | 10                        |                           |
| Pope & Talbot, Halsey<br>(OR0001074)                                       | FE                 |                         | 0<br>(corrected)    | 0.5 - 6.7 <sup>b, d</sup> | 3.6 - 4.7 <sup>b, d</sup> |
| Simpson Kraft, Tacoma<br>(WA0000850)                                       | FE                 | 0.8 <sup>b</sup>        |                     |                           |                           |
| <b>TCDF Detects</b>  |                    |                         |                     |                           |                           |
| Parsons & Whittemore<br>Alabama River Pulp,<br>Claiborne<br>(AL0025968)    | BP                 |                         | 19<br>(confirmed)   |                           |                           |
| International Paper, Bastrop<br>(LA0007561)                                | BP                 |                         |                     |                           | 12.8                      |
| Georgia-Pacific, Palatka<br>(FL0002763)                                    | FE                 |                         |                     |                           | 12                        |
| Weyerhaeuser, Port<br>Wentworth<br>(GA0002798)                             | BP                 |                         | 0<br>(corrected)    |                           |                           |
| Boise, Jackson<br>(AL0002755)  | BP                 |                         | 11.3<br>(confirmed) |                           |                           |
| Bowater, Calhoun<br>(TN0002356)  | BP                 |                         |                     | 10                        |                           |

**Table 4-13 (Continued)**

| Mill<br>(NPDES Permit Number)              | Location | 2001 | 2002 <sup>a</sup> | 2003 | 2004 |
|--|----------|------|-------------------|------|------|
| Georgia-Pacific, Clatskanie<br>(OR0000795) | FE       |      | 0<br>(corrected)  |      |      |

FE - Final Effluent.

BP - Bleach Plant, internal monitoring location.

NOTE: if no value is shown, either TCDD and TCDF were not monitored, or reported value was less than detection limit (e.g., <10 pg/L).

<sup>a</sup>Screening-level *PCSLoads2002* data were provided to industry April 5, 2005. Industry confirmed TCDD and TCDF concentrations retrieved from PCS and submitted written explanations where disagreements existed. EPA evaluated the information provided and corrected *PCSLoads2002*.

<sup>b</sup>Concentrations less than method 1613 minimum level.

<sup>c</sup>Outfall is surface impoundment formerly used to treat mill effluent.

<sup>d</sup>More than one concentration measured; measured concentrations presented as a range.

ePOTW receiving chemical pulp mill wastewater from Mead/Westvaco (New Page); Luke (MD0021687).

One mill (Bowater Catawba, SC) confirmed it measured a TCDD concentration of 83.6 pg/L in a final effluent sample collected May 13, 2002 [10]. Bowater reports that, since that date, neither TCDD nor TCDF has been measured in mill wastewaters above the method detection limit (10 pg/L). Bowater reported a TCDD concentration of 5.2 pg/L, also at the final effluent, in 2003. This concentration is less than the Method 1613 ML and demonstrates compliance with the mill's permit limits. Prior to 2002, Bowater Catawba was not yet using Elemental Chlorine-Free (ECF) bleaching technology. The mill is enrolled in Tier 1 of EPA's VATIP and as such was provided with a six-year schedule for compliance with the Cluster Rules requirements. After 2002, the Bowater Catawba mill converted to 100% chlorine dioxide bleaching and started up an advanced fiber line [10].

Table 4-13 includes the TCDD concentration measured in 2001 at the Weyerhaeuser mill in Johnsonburg, PA. The outfall in which TCDD was detected is a surface impoundment that was previously used to treat mill effluent. In 1992, the impoundment was drained and is currently in the process of nonhazardous waste closure. The impoundment is not an active treatment facility, but the permitting authority, Pennsylvania Department of Environmental Protection, requires TCDD monitoring of this outfall due to the accumulated sludge deposits. Discharges from this monitoring location represent past practices and do not reflect current mill operations [11]. Since 2001, no TCDD has been measured at the mill above the method detection limit.

## Bleach Plant Chlorinated Phenolic Compounds

EPA analyzed PCS data for chlorinated phenolic compounds in bleach plant effluent. This analysis was similar to the analysis of TCDD and TCDF discharges. Again, too few detectable concentrations were available to analyze discharge loads (grams/year discharged). Instead, EPA counted the number of mills monitoring for chlorinated phenolic compounds and the number detecting them at concentrations above analytical detection limits.

Table 4-14 presents the number of mills for which chlorinated phenolic compounds data were available in PCS for the period 1998 to 2004. By 2004, approximately 40 bleached kraft mills monitored for chlorinated phenolic compounds. Most of these mills monitor for all 12 of the regulated chlorinated phenolic compounds.

**Table 4-14. Number of Bleached Papergrade Kraft Mills Reporting Chlorinated Phenolic Compounds Data to PCS**

|                                    | Mills Reporting Chlorinated Phenolic Compounds Data <sup>a</sup> |      |      |      |      |                   |      | Stopped monitoring between 1998 and 2004 |
|------------------------------------|--|------|------|------|------|-------------------|------|--|
|                                    | 1998   | 1999 | 2000 | 2001 | 2002 | 2003 <sup>b</sup> | 2004 |  |
| Trichlorosyringol                  |  | 3    | 7    | 18   | 29   | 33                | 41   |  |
| Total Trichlorophenol <sup>c</sup> | 2  | 2    | 2    | 1    | 2    | 2                 | 2    | 1  |
| 3,4,5-Trichlorocatechol            |  | 3    | 7    | 18   | 29   | 33                | 40   |  |
| 3,4,5-Trichloroguaiacol            |  | 1    | 5    | 14   | 24   | 28                | 34   |  |
| 3,4,6-Trichlorocatechol            |  | 3    | 7    | 18   | 29   | 33                | 40   |  |
| 3,4,6-Trichloroguaiacol            |  | 3    | 6    | 17   | 26   | 30                | 38   |  |
| 4,5,6-Trichloroguaiacol            |  | 3    | 7    | 18   | 29   | 33                | 41   |  |
| Tetrachlorocatechol                |  | 3    | 7    | 18   | 29   | 33                | 41   |  |
| Tetrachloroguaiacol                |  | 3    | 7    | 17   | 28   | 32                | 40   |  |
| 2,3,4,6-Tetrachlorophenol          |  | 3    | 6    | 17   | 26   | 30                | 38   |  |
| Pentachlorophenol                  | 2  | 5    | 9    | 18   | 29   | 32                | 40   |  |

<sup>a</sup>Operating under a single permit, the Parsons & Whittemore mills (Alabama Pine Pulp and Alabama River Pulp) in Claiborne, AL reported data for 10 chlorinated phenolic compounds from 2002 through 2004. The identified mill counts include the two Parsons & Whittemore mills.

<sup>b</sup>Excludes one mill (Willamette Industries Inc. in Bennetsville, SC), which measured 10 chlorinated phenolic compounds in year 2003 and at no other time during the 1998 through 2004 study period.

<sup>c</sup>Cluster Rules include limitations for 2,4,6-trichlorophenol and 2,4,5-trichlorophenol. PCS contains only a total trichlorophenol parameter.

Although the Cluster Rules have ELGs for 2,4,6-trichlorophenol and 2,4,5-trichlorophenol, no parameter code exists in PCS for either compound. PCS has a parameter code for total trichlorophenol, and total trichlorophenol data are available in PCS for two mills.

Table 4-14 shows that PCS includes 1998 data for trichlorophenol and pentachlorophenol for two bleached kraft mills, but no other chlorinated phenolic compounds. The number of mills monitoring for chlorinated phenolic compounds has increased steadily over time. As of 2004, PCS had data for at least one chlorinated phenolic compound for 40 bleached kraft mills.

Table 4-15 presents the concentrations of chlorinated phenolic compounds detected in wastewaters from the only two mills that reported these compounds at concentrations above the MLs during the period 2001 to 2004. The MLs achievable by EPA Method 1653 for chlorinated phenolic compounds vary by compound. EPA has confirmed the discharge from International Paper mill in Georgetown, SC [12]. EPA has contacted representatives from the Weyerhaeuser Port Wentworth mill to confirm reported concentrations, but has not yet received a response. Because the Weyerhaeuser-reported concentrations are 1,000 times the method ML, the units reported to PCS may be incorrect.

**Table 4-15. Concentrations of Chlorinated Phenolic Compounds Detected in Bleached Papergrade Kraft Mill Bleach Plant Effluent (µg/L)**

| Chlorinated Phenolic Compounds                                |    | 2001 | 2002                 | 2003 | 2004           |
|---|----|------|----------------------|------|----------------|
| <b>Weyerhaeuser, Pt. Wentworth</b> NPDES Permit GA0002798     |    |      |                      |      |                |
| 3,4,5-trichlorocatechol                                       | BP |      | 2,500 - 5,000 (DL=5) |      |                |
| 3,4,6-trichloroguaiacol                                       | BP |      | 2,500 (DL=2.5)       |      |                |
| <b>International Paper, Georgetown</b> NPDES Permit SC0000868 |    |      |                      |      |                |
| 4,5,6-trichloroguaiacol                                       | BP |      |                      |      | 3,100 (DL=2.5) |

FE - Final effluent.

BP = Bleach plant, internal monitoring location.

EPA estimated baseline loads for all mills, including those that share discharges (i.e., Domtar mills in Wisconsin and Parsons & Whittemore mills in Alabama). For the pollutant reduction calculations, EPA summed the baseline loads for the two mills.

For the mills that reported discharges to PCS in 2002, EPA estimated 1995 baseline loads of chlorinated phenolic compounds were 4,178 TWPE. In 2002, reported loads, excluding the two Weyerhaeuser Port Wentworth measurements discussed above, were zero. EPA concludes that the ELGs have been effective at reducing bleach plant discharges of chlorinated phenolic compounds.

### **Bleach Plant Chloroform Loads**

EPA analyzed PCS data for chloroform in bleach plant effluents. Unlike TCDD, TCDF, and chlorinated phenolic compounds, chloroform is typically measured at concentrations above method detection limits. For this reason, EPA was able to calculate the load (grams/year) discharged in each mill's bleach plant effluent. Table 4-16 presents the number of mills for which PCS contains bleach plant chloroform data for the period 1999 to 2004 (PCS contains no bleach plant chloroform data for 1998).

In addition to estimating the annual discharge load for each mill, EPA compared the estimated load to the baseline load it had estimated for the mill, and tallied the number of mills for which the annual load was above the baseline and the number below. Table 4-16 shows that the majority of mills (e.g., 26 of the 29 reporting in 2004) report loads below the facility-specific baseline loads.

**Table 4-16. Number of Mills Reporting Chloroform Monitoring Data to PCS, by Year, and Relative to Baseline**

|  | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|--|------|------|------|------|------|------|------|
| Total number of mills with bleach plant chloroform data in PCS             | 0    | 3    | 7    | 13   | 22   | 26   | 29   |
| Number of mills operating above EPA's estimate of their 1995 baseline load | -    | -    | 1    | 2    | 2    | 2    | 3    |
| Number of mills operating below EPA's estimate of their 1995 baseline load | -    | 3    | 6    | 11   | 20   | 24   | 26   |
| % reduction from baseline <sup>a</sup>                                     | -    | 99%  | 99%  | 97%  | 98%  | 98%  | 98%  |

<sup>a</sup>Percent reduction is (EPA estimate of 1995 baseline - PCS reported) / (EPA estimate of 1995 baseline) × 100.

EPA also calculated the difference between the estimated annual loads and baseline loads, and the percent reduction from baseline for the mills with chloroform data in PCS for each year. Table 4-16 presents the percent reduction from baselines for each year, 1999 to 2004. For the 29 mills with data in PCS in 2004, the total annual load was 98 percent less than EPA's estimated 1995 baseline for these mills.

During the 1998-to-2004 study period, chloroform bleach plant loads at three mills were greater than EPA's estimate of their 1995 baseline loads. Table 4-17 presents the annual chloroform loads for these three mills. EPA reviewed PCS permit compliance data for these three mills and determined that they did not violate their chloroform permit limits during the study period.

As of 1995, the mills included in Table 4-17 used no hypochlorite, but instead complete substitution of chlorine dioxide (ClO<sub>2</sub>) for chlorine [8]. Changes in production or bleaching activities might have occurred at each of these mills after 1995 so that discharged loads may no longer be comparable to 1995 estimates. EPA will contact these mills to discuss mill changes.

**Table 4-17. Annual Loads of Three Mills with Chloroform Loads Above Baseline Loads**

|                                       | <b>1995<br/>Baseline<br/>Load<br/>(kg/yr)<sup>a</sup></b> | <b>1995<br/>Bleaching<br/>Technology</b>     | <b>2000<sup>b</sup><br/>(kg/yr)</b> | <b>2001<br/>(kg/yr)</b> | <b>2002<br/>(kg/yr)</b> | <b>2003<br/>(kg/yr)</b> | <b>2004<br/>(kg/yr)</b> |
|---------------------------------------|---|--|-------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Bowater, Coosa Pines<br>(AL0003158)   | 246   | No<br>hypochlorite;<br>100% ClO <sub>2</sub> | NR                                  | 317                     | 383                     | 292                     | 271                     |
| Weyerhaeuser, New Bern<br>(NC0003191) | 111   | No<br>hypochlorite;<br>100% ClO <sub>2</sub> | NR                                  | NR                      | NR                      | NR                      | 145                     |
| Weyerhaeuser, Columbus<br>(MS0036412) | 302   | No<br>hypochlorite;<br>100% ClO <sub>2</sub> | 637                                 | 1,060                   | 1,384                   | 1,442                   | 958                     |

NR - not reported; PCS does not contain chloroform monitoring data.

<sup>a</sup>Estimated baseline is production multiplied by a discharge factor, based on a mills bleaching chemical.

<sup>b</sup>PCS does not contain chloroform data for any of the three mills prior to 2000.

### **Final Effluent AOX, COD, and Color Loads**

EPA analyzed PCS data for AOX, COD, and color. Final effluent discharges of these pollutants were analyzed during the development of the Cluster Rules because they are generated in pulping and bleaching operations. For this reason, although COD and color discharges are not regulated by the Cluster Rules, EPA analyzed their current discharges along with the discharges of AOX. These pollutants are typically measured in final effluent at concentrations above method detection limits. Consequently, EPA was able to calculate discharge loads (kg/year). Table 4-18 presents the number of mills for which PCS contained monitoring data for these pollutants for the period 1998 to 2004. PCS included data for AOX for 17 mills in 1998, increasing to 38 mills by 2004. PCS includes COD and color data for fewer mills; in 2004, PCS included COD data for 7 mills and color data for 20 mills.

In addition to estimating annual discharge load of AOX, COD, and color for each mill, EPA compared the estimated load to the baseline load it had estimated for the mill, and tallied the number of mills for which the annual load was above the baseline and the number below. Table 4-18 shows that, for AOX, the majority of mills (e.g., 30 of the 38 mills with data in PCS for 2004) report loads below the facility-specific baseline loads.



EPA also calculated the difference between the estimated annual loads and baseline loads, and the percent reduction from baseline. Table 4-18 presents the percent reduction from baseline for all reporting mills, for each year from 1998 to 2004. The calculated annual load for most mills is below EPA's estimate of their baseline loads. During the study period, the annual AOX, COD, or color loads for five mills were zero (kg/yr). EPA calculated zero loads from monthly ML measurements or other "no data" indicators. Zero loads are included in the analysis.

EPA suspects the 1999 AOX discharge from Georgia-Pacific in Port Hudson Mill in Zachary, LA may also be erroneous because it is a hundred times greater than any other calculated load. It has a significant impact on the percent reduction for 1999 and is responsible for the gain with respect to the baseline loads for 1999 shown in Table 4-18. As it completes this study, EPA will contact the Zachary, LA mill to verify the accuracy of the 1999 AOX data in PCS.

**Table 4-18. Number of Mills Reporting Monitoring Data for AOX, COD, and Color to PCS by Year and Relative Baseline Loads**

|  | 1998 | 1999   | 2000 | 2001 | 2002 | 2003 | 2004 |
|--|------|--------|------|------|------|------|------|
| <b>AOX</b>   |      |        |      |      |      |      |      |
| Total number of mills with AOX data in PCS                                 | 17   | 19     | 21   | 27   | 35   | 41   | 38   |
| Number of mills operating above EPA's estimate of their 1995 baseline load | 4    | 5      | 4    | 3    | 8    | 8    | 8    |
| Number of mills operating below EPA's estimate of their 1995 baseline load | 13   | 14     | 17   | 24   | 27   | 33   | 30   |
| % load reduction (gain) from baseline                                      | 60%  | (334%) | 70%  | 74%  | 69%  | 66%  | 61%  |
| <b>COD</b>   |      |        |      |      |      |      |      |
| Total number of mills with COD data in PCS                                 | 0    | 1      | 3    | 2    | 6    | 6    | 7    |
| Number of mills operating above EPA's estimate of their 1995 baseline load | -    | 1      | -    | 1    | -    | -    | -    |
| Number of mills operating below EPA's estimate of their 1995 baseline load | -    | -      | 3    | 2    | 6    | 6    | 7    |
| % load reduction (gain) from baseline                                      | -    | (6%)   | 53%  | 39%  | 38%  | 39%  | 45%  |

**Table 4-18 (Continued)**

|  | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|--|------|------|------|------|------|------|------|
| <b>Color<sup>a</sup></b>   |      |      |      |      |      |      |      |
| Total number of mills with color data in PCS                               | 18   | 18   | 17   | 18   | 21   | 21   | 20   |
| Number of mills operating above EPA's estimate of their 1995 baseline load | 9    | 8    | 7    | 6    | 6    | 8    | 8    |
| Number of mills operating below EPA's estimate of their 1995 baseline load | 9    | 10   | 10   | 12   | 15   | 13   | 12   |
| % load reduction (gain) from baseline                                      | 6%   | 22%  | 30%  | 29%  | 39%  | 14%  | 8%   |

<sup>a</sup>VATIP mills excluded from counts.

EPA did not promulgate limits for COD or color under the Cluster Rules, but the state permit writers have the authority to develop facility permit limits that are protective of state water-quality standards (i.e., water-quality-based effluent limits (WQBEL)). Some states with sensitive receiving streams have chosen to include final effluent limits for COD and/or color in bleached kraft mill permits. Table 4-19 presents the number of mills with COD or color data in PCS, by state.

**Table 4-19. Number of Mills With COD or Color Data in PCS in 2004, by State**

|                | Mill Population in 1998 |                | Mills with 2004 Data in PCS |    | Report COD <sup>a</sup> | Report Color <sup>b</sup> |                       |
|----------------|-------------------------|----------------|-----------------------------|----|-------------------------|---------------------------|-----------------------|
|                | BPK                     | PS             | BPK                         | PS | 2004 <sup>c</sup>       | 2004                      | Between 1998 and 2004 |
| Alabama        | 11                      |                | 8                           |    |                         | 1                         | 1                     |
| Maine          | 7                       | 1              | 6                           |    |                         | 3                         | 5 <sup>d</sup>        |
| Washington     | 4                       | 3 <sup>e</sup> | 4                           | 1  |                         |                           |                       |
| Wisconsin      | 2                       | 5              | 2                           | 3  |                         |                           |                       |
| Georgia        | 5                       |                | 3                           |    | 1                       | 2                         | 2                     |
| Pennsylvania   | 5                       | 1              | 3                           |    | 2                       | 3                         | 3                     |
| Texas          | 5                       |                | 2                           |    |                         |                           |                       |
| Arkansas       | 4                       |                | 4                           |    |                         |                           |                       |
| Florida        | 4                       |                | 2                           |    |                         | 1                         | 1                     |
| Louisiana      | 4                       |                | 4                           |    |                         |                           |                       |
| North Carolina | 4                       |                | 4                           |    | 1                       | 2                         | 2                     |
| South Carolina | 4                       |                | 4                           |    |                         | 2                         | 3                     |

**Table 4-19 (Continued)**

|               | Mill Population in 1998 |    | Mills with 2004 Data in PCS |    | Report COD <sup>a</sup> | Report Color <sup>b</sup> |                       |
|---------------|-------------------------|----|-----------------------------|----|-------------------------|---------------------------|-----------------------|
|               | BPK                     | PS | BPK                         | PS | 2004 <sup>c</sup>       | 2004                      | Between 1998 and 2004 |
| Michigan      | 3                       |    | 2                           |    |                         |                           |                       |
| Mississippi   | 3                       |    | 2                           |    |                         |                           |                       |
| Oregon        | 3                       |    | 3                           |    |                         | 1                         | 2                     |
| Virginia      | 3                       |    | 3                           |    | 3                       | 3                         | 3                     |
| California    | 2                       |    | 1                           |    |                         |                           |                       |
| Kentucky      | 2                       |    | 2                           |    |                         |                           |                       |
| Minnesota     | 2                       |    | 1                           |    |                         |                           |                       |
| New York      | 1                       | 1  | 1                           | 1  |                         | 1                         | 1                     |
| Tennessee     | 2                       |    | 2                           |    |                         | 1                         | 1                     |
| Idaho         | 1                       |    | 1                           |    |                         |                           |                       |
| Maryland      | 1                       |    |                             |    |                         |                           |                       |
| Montana       | 1                       |    |                             |    |                         |                           |                       |
| New Hampshire | 1                       |    | 1                           |    |                         |                           |                       |
| Ohio          | 1                       |    | 1                           |    |                         |                           |                       |
| Total         | 84                      | 11 | 66                          | 5  | 7                       | 20                        | 24                    |

<sup>a,b</sup>PCS does not include COD or color data for papergrade sulfite mills.

<sup>c</sup>No mills that reported COD loads to PCS have stopped monitoring during the study period (1998 through 2004). The population of mills reporting COD is greatest in 2004.

<sup>d</sup>The only Maine mill that did not report a color load to PCS is Lincoln Pulp & Paper (ME0002003). EPA has not collected the mill's permit. The Lincoln mill's active permit was issued on 1/23/1997 and expired 3/31/2002.

During the study period, annual loads of either AOX, COD, or color for 21 mills were greater than EPA's estimate of their baseline load. Table 4-20 presents estimated loads for the five mills for which the calculated annual load for more than one pollutant was observed above baseline. Changes in production or bleaching activities might have occurred at each of these mills after 1995 so that discharged loads might no longer be comparable to 1995 estimates.

**Table 4-20. Mills for Which Calculated Annual Load Exceeded EPA Estimated Baseline Load for More than One Pollutant**

|   | Pollutant | EPA's<br>Estimated<br>Baseline Load<br>(kg/y) | Highest<br>Measured<br>Load (yr) | Highest<br>Measured<br>Load (kg/y) | 2004 Load<br>(kg/y) |
|---|-----------|---|----------------------------------|------------------------------------|---------------------|
| Kimberly-Clark Corp, Coosa Pines<br>(AL0003158) | AOX       | 126,126                                       | 2001                             | 172,460                            | 125,880             |
|   | Color     | 15,110,200                                    | 1998                             | 84,844,730                         | 31,937,542          |
| Weyerhaeuser, Port Wentworth<br>(GA0002798)     | AOX       | 115,045                                       | 2004                             | 256,020                            | 256,020             |
|   | Color     | 18,165,000                                    | 2003                             | 39,235,226                         | 24,631,232          |
| Pope & Talbot, Halsey<br>(OR0001074)            | AOX       | 66,633  | 2003                             | 380,037                            | 33,026              |
|   | Color     | 7,540,050                                     | 1999                             | 13,113,683                         | 3,251,130           |
| Weyerhaeuser, Bennettsville<br>(SC0042188)      | AOX       | 92,329  | 1999                             | 279,528                            | not reported        |
|   | Color     | 10,447,710                                    | 1998                             | 30,733,522                         | not reported        |
| Stone Container, West Point<br>(VA0003115)      | COD       | 10,668,616                                    | 1999                             | 11,342,612                         | 8,949,075           |
|   | Color     | 16,383,946                                    | 1999                             | 23,364,280                         | 19,067,745          |

The Weyerhaeuser Flint River Mill is classified as a minor discharger by the state of Georgia; therefore, PCS does not contain discharge data for that mill. The mill voluntarily supplied final effluent monitoring data for AOX, color, and various other conventional pollutants that are measured at the facility [13]. Table 4-21 shows AOX and color loads for this mill; each were significantly below EPA's estimated baseline loads.

**Table 4-21. Weyerhaeuser Flint River Mill (Oglethorpe GA) Calculated Annual Load Compared to EPA Estimated Baseline Load**

|   | Pollutant | EPA's<br>Estimated<br>Baseline<br>Load<br>(kg/y) | Highest<br>Measured<br>Load (yr) | Highest<br>Measured<br>Load (kg/y) | 2004 Load<br>(kg/y) |
|---|-----------|--|----------------------------------|------------------------------------|---------------------|
| Weyerhaeuser/Flint River Mill<br>Oglethorpe, GA | AOX       | 213,629  | 2002                             | 33,371                             | 7,468               |
|   | Color     | 13,695,500                                       | 2004                             | 380,305                            | 380,305             |

### **4.3.2 Papergrade Sulfite**

As discussed in Section 4.2.3, at the time the Cluster Rules were promulgated, 11 papergrade sulfite mills operated in the United States. EPA identified six papergrade sulfite mills operating in 2004. These six mills include four mills that produce pulp using calcium, magnesium, or sodium sulfite acidic cooking liquors (Segment A); and two mills that produce pulp using an ammonium sulfite acidic liquor (Segment B). Monitoring results for one of these six mills (Domtar Port Edwards) were analyzed with the bleached kraft mill data, because this mill shares a wastewater treatment facility and an NPDES permit with the Domtar Nekoosa bleached kraft mill.

Cluster Rules ELGs for papergrade sulfite mills differ from the ELGs for bleached kraft mills. As summarized in Table 4-3, the ELGs for direct discharging papergrade sulfite mills include:

- Limits only for final effluent AOX for calcium, magnesium, or sodium sulfite mills (Segment A); and
- Bleach plant limits for TCDD, TCDF, and chlorinated phenolic compounds, but not for chloroform or final effluent AOX limits, for ammonium-based sulfite mills (Segment B).

Data are available in PCS for only two papergrade sulfite mills, one magnesium-sulfite mill (Segment A) and one ammonium sulfite mill (Segment B). Table 4-22 presents the baseline loads for these two mills and the estimated loads for 1998 through 2004. Available loading information for each segment is discussed below.

#### **Calcium, Magnesium, or Sodium-Based Sulfite Mills (Segment A)**

Although the Cluster Rules require Segment A mills to monitor AOX at the final effluent, permits for the three Segment A mills do not contain AOX limits, and PCS contains no AOX loads for these mills for 1998 through 2004. Table 4-22 presents data for one mill

(Weyerhaeuser in Rothschild, WI). The concentrations of TCDD and TCDF in final effluent reported for this mill were below the Method 1613B detection limit.

### **Ammonium-Based Sulfite Mills (Segment B)**

PCS includes monitoring data for all Cluster Rules pollutants for only one of the two ammonium-based sulfite mills (Finch Pruyn in Glens Falls, NY). Table 4-22 presents calculated annual loads where data were available. It should be noted that Finch Pruyn experienced periods of low paper production from 2001 through 2004 due to labor and market conditions, so AOX and other discharges during that period do not reflect normal mill operations.

EPA has not analyzed PCS discharge data for the other ammonium-based sulfite mill (Kimberly-Clark Worldwide in Everett, WA). Washington State has examined this mill's in-plant monitoring data for compliance, but did not submit the data to PCS. See Section 4.3.3 for a discussion of Washington State data.

**Table 4-22. Loads for Two Papergrade Sulfite Mills, 1995 Baseline and 1998 through 2004**

| <b>Weyerhaeuser, Rothschild<br/>(WI0026042)<br/>Magnesium Sulfite, Segment A</b>            | <b>EPA's<br/>Estimated<br/>Baseline Load<br/>(kg/y)</b> | <b>1998<br/>(kg/y)</b> | <b>1999<br/>(kg/y)</b> | <b>2000<br/>(kg/y)</b> | <b>2001<br/>(kg/y)</b> | <b>2002<br/>(kg/y)</b> | <b>2003<br/>(kg/y)</b> | <b>2004<br/>(kg/y)</b> |
|---|---|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| TCDD (final effluent)   | 0   | ND                     | ND                     | ND                     | ND                     |                        |                        |                        |
| TCDF (final effluent)   | 0   | ND                     | ND                     | ND                     | ND                     |                        |                        |                        |
| <b>Finch Pruyn; Glens Falls<br/>(NY0005525)<sup>a</sup><br/>Ammonium Sulfite, Segment B</b> | <b>EPA's<br/>Estimated<br/>Baseline Load<br/>(kg/y)</b> | <b>1998<br/>(kg/y)</b> | <b>1999<br/>(kg/y)</b> | <b>2000<br/>(kg/y)</b> | <b>2001<br/>(kg/y)</b> | <b>2002<br/>(kg/y)</b> | <b>2003<br/>(kg/y)</b> | <b>2004<br/>(kg/y)</b> |
| AOX   | 323,559   |                        |                        |                        | 41,834                 | 1,826                  | 63,692                 | 190,568                |
| Chlorinated Phenolic Compounds<br>(bleach plant)  |   |                        |                        |                        |                        |                        |                        |                        |
| Trichlorosyringol   | 53  |                        |                        |                        | ND                     | ND                     | ND                     | ND                     |
| 3,4,5-Trichlorocatechol   | 347   |                        |                        |                        | ND                     | ND                     | ND                     | ND                     |
| 3,4,5-Trichloroguaiacol   | 117   |                        |                        |                        | ND                     | ND                     | ND                     | ND                     |
| 3,4,6-Trichlorocatechol   | 11  |                        |                        |                        | ND                     | ND                     | ND                     | ND                     |
| 3,4,6-Trichloroguaiacol   | 21  |                        |                        |                        | ND                     | ND                     | ND                     | ND                     |
| 4,5,6-Trichloroguaiacol   | 83  |                        |                        |                        | ND                     | ND                     | ND                     | ND                     |

**Table 4-22 (Continued)**

| <b>Finch Pruyn; Glens Falls<br/>(NY0005525)<sup>a</sup><br/>Ammonium Sulfite, Segment B</b> | <b>EPA's<br/>Estimated<br/>Baseline Load<br/>(kg/y)</b> | <b>1998<br/>(kg/y)</b> | <b>1999<br/>(kg/y)</b> | <b>2000<br/>(kg/y)</b> | <b>2001<br/>(kg/y)</b> | <b>2002<br/>(kg/y)</b> | <b>2003<br/>(kg/y)</b> | <b>2004<br/>(kg/y)</b> |
|---|---|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Tetrachlorocatechol   | 88  |                        |                        |                        | ND                     | ND                     | ND                     | ND                     |
| Tetrachloroguaiacol   | 45  |                        |                        |                        | ND                     | ND                     | ND                     | ND                     |
| 2,3,4,6-Tetrachlorophenol   | 6   |                        |                        |                        | ND                     | ND                     | ND                     | ND                     |
| Pentachlorophenol   | 11  |                        |                        |                        | ND                     | ND                     | ND                     | ND                     |
| TCDD (bleach plant)   | 0.0002 (g/yr)   |                        |                        |                        | ND                     | ND                     | ND                     | ND                     |
| TCDF (bleach plant)   | 0.0018 (g/yr)   |                        |                        |                        | ND                     | ND                     | ND                     | ND                     |

<sup>a</sup>2001 to 2004 was a period of low production due labor and market conditions.

ND - Concentrations were below the method detection limit.

### 4.3.3 Washington State Paper Mills

During this detailed review, EPA found that data from only two of the six Washington State mills are included in PCS from 1998 through 2004. As of 2004, six active pulp and paper mills were located in Washington State, including five bleached kraft and one papergrade sulfite mill. In 2004, each of these mills monitored mill effluents for TCDD and TCDF. Typically, these data are submitted to the Washington Department of Ecology, imported into the state's database (the Water Quality Permit Lifecycle System), examined for compliance by the state, and transferred to EPA's PCS system. Because of an error in this transfer process, data from only two of the six Washington State mills are included in PCS (Weyerhaeuser in Cosmopolis and Simpson Kraft in Tacoma). All values of TCDD but one that are included in PCS for these mills are "not detected." The exception is one 2001 measurement from the Simpson Tacoma Kraft Mill, reported as 0.8 pg/L, which is less than the Method 1613 ML of 10 pg/L.

EPA contacted the Washington Department of Ecology about the missing data. The Department of Ecology provided bleach plant concentration data for each of its active mills, but no discharge flow data [14]. Table 4-23 summarizes the reported TCDD and TCDF data, presenting the number of times the pollutant was detected during the reporting year and the number of measurements. For example, the TCDD counts for 2001 for Boise, Wallula are shown as 0/6. This means that all six TCDD measurements made in 2001 were nondetects.

**Table 4-23. Counts of TCDD and TCDF Detected in Washington State Phase I Mill Bleach Plants**

|   | NPDES Permit Dates                  | Pollutant                  | Number of Detects/Number of Measurements |       |                    |                      |
|---|-------------------------------------|----------------------------|--|-------|--------------------|----------------------|
|   |                                     |                            | 2001                                     | 2002  | 2003               | 2004                 |
| Bleached Kraft Mills  |                                     |                            |  |       |                    |                      |
| Boise, Wallula (WA0003697)                                    | issued: 7/1/01<br>expires: 7/1/06   | TCDD                       | 0/6                                      | 0/12  | 0/12               | 0/12                 |
|   |                                     | TCDF                       | 2/6                                      | 1/12  | 0/12               | 2/12                 |
| Simpson Tacoma Kraft, Tacoma (WA0000850)                      | issued: 11/1/01<br>expires: 11/1/06 | TCDD                       | 0/1                                      | 0/12  | 0/12               | 0/12                 |
|   |                                     | TCDF                       | 0/1                                      | 0/12  | 0/12               | 0/12                 |
| Weyerhaeuser, Longview (WA0000124)                            | issued: 6/1/04<br>expires: 6/1/09   | TCDD                       |  |       |                    | 0/7                  |
|   |                                     | TCDF                       |  |       |                    | 3/7                  |
| James River <sup>a</sup> (Georgia-Pacific), Camas (WA0000256) | issued: 4/15/03<br>expires: 4/15/08 | TCDD                       |  |       | K4: 0/8<br>K5: 0/8 | K4: 0/12<br>K5: 0/12 |
|   |                                     | TCDF                       |  |       | K4: 0/8<br>K5: 0/8 | K4: 0/12<br>K5: 0/12 |
| Papergrade Sulfite Mill (Ammonium-Based, Segment B)           |                                     |                            |  |       |                    |                      |
| Kimberly-Clark, Everett <sup>b</sup> (WA0000621)              | issued: 11/15/04<br>expires: 2/1/09 | TCDD                       | 2/12                                     | 0/13  | 1/17               | 0/14                 |
|   |                                     | TCDF                       | 13/14                                    | 12/13 | 16/17              | 10/12                |
|   |                                     | TCDF (intake) <sup>b</sup> |  |       | 10/11              | 8/12                 |

NOTE: If no value is shown, the mill did not monitor for that pollutant.

<sup>a</sup>The James River in Camas, WA monitors TCDD and TCDF at two fiber lines (K4 and K5).

<sup>b</sup>Samples were collected at water intake to determine the extent of external TCDF formation.

As shown in Table 4-23, TCDF was detected in bleach plant effluent from three of the Washington State Phase I mills. Although the Boise, Wallula and Weyerhaeuser, Longview mills detected TCDF, the concentrations were less than the Cluster Rules daily maximum limitation (31.9 pg/L). The Kimberly-Clark, Everett mill detected TCDF at concentrations greater than the Cluster Rules daily maximum limitation and it also exceeded Cluster Rules daily maximum limitations for TCDD. The Kimberly-Clark mill in Everett is discussed in more detail in Section 5.0.



## 5.0 REVIEW OF TRI DATA

As noted in Section 1.0, EPA is conducting this detailed study of the Pulp and Paper Category because it ranked highest among all point source categories for toxic pollutant discharges [1]. EPA calculated this rank using the sum of the TRI-reported pounds, weighted by toxicity, and the estimated PCS annual discharges, weighted by toxicity. EPA refers to pounds weighted by toxicity as toxic-weighted pound equivalents (TWPE). For the Pulp and Paper Category these estimates are:

$$(\text{TRI}) 3.13 \text{ million TWPE} + (\text{PCS}) 1.52 \text{ million TWPE} = 4.65 \text{ million TWPE}$$

As discussed in Section 4.3.1, EPA estimated that, in 2002, one bleached kraft mill, Bowater Catawba, SC, discharged 0.88 grams of TCDD, which equates to 1.37 million TWPE.<sup>4</sup> This mill has since changed its operations and has not detected either TCDD or TCDF in its discharges since 2002. Without the Bowater-related PCS TWPE, the category discharges are:

$$(\text{TRI}) 3.13 \text{ million TWPE} + (\text{PCS}) 0.15 \text{ million TWPE (without Bowater Catawba)} = 3.28 \text{ million TWPE}$$

The TRI TWPE for the Pulp and Paper Category is almost four times greater than any other category. Because of this very large TRI TWPE, even without the Bowater-related PCS TWPE, this category ranks highest among all point source categories for toxic and nonconventional pollutant discharges.

This section presents EPA's preliminary analysis of the Pulp and Paper Category pollutant discharges reported to TRI. Both Phase I and Phase II mills are included in this analysis. Phase III mills are not included because, as discussed in Section 1.2, in 2004 EPA determined that it would not promulgate revised ELGs for Phase III mills. EPA's analysis of TRI data is presented in the following subsections:

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<sup>4</sup>Although this mill dominates the PCS TWPE, it does not similarly dominate the TRI TWPE. Its 2002 dioxins release is less than 6% of the Pulp and Paper Category's total TRI-reported dioxins releases.

- Section 5.1: *TRIReleases2002* Results Discussed with AF&PA;
- Section 5.2: TRI-Reported Dioxins Releases;
- Section 5.3: Comparison of TRI and PCS Dioxins Discharge Data;
- Section 5.4: TRI-Reported Polycyclic Aromatic Compounds (PACs); and
- Section 5.5: Metals and Other Chemicals Reported to TRI.

## 5.1 *TRIReleases2002* Results Discussed with AF&PA

Table 5-1 lists the 10 pollutants with the highest TWPE of TRI-reported discharges for 2002, in order of descending TWPE. Table 5-1 lists the number of mills that reported pollutant discharges to TRI and for each pollutant, the number of mills that reported discharges, the pounds discharged, and TWPE. Discharges include direct discharges to surface waters and transfers to POTWs. POTW transfers are included in the total discharges after POTW removals are taken into account.

**Table 5-1. Top 10 Pollutants in *TRIReleases2002*, for Phase I and Phase II**

| Number of TRI-reporting Facilities | Phase I  |                |                  | Phase II  |                |                | Total            |
|------------------------------------|----------|----------------|------------------|-----------|----------------|----------------|------------------|
|                                    | 87 mills |                |                  | 169 mills |                |                | 256 mills        |
| Pollutants                         | Mills    | Released (lbs) | TWPE             | Mills     | Released (lbs) | TWPE           | TWPE             |
| Dioxins                            | 47       | 0.1334         | 2,760,188        | 14        | 0.0129         | 46,363         | 2,806,551        |
| Lead and Lead Compounds            | 71       | 12,717         | 28,485           | 114       | 16,695         | 37,396         | 65,881           |
| Manganese and Manganese Compounds  | 72       | 3,436,371      | 49,597           | 39        | 857,936        | 12,383         | 61,980           |
| PACs                               | 51       | 884            | 30,231           | 27        | 440            | 15,067         | 45,298           |
| Chlorine                           | 5        | 26,382         | 13,433           | 7         | 21,357         | 10,874         | 24,307           |
| Zinc and Zinc Compounds            | 47       | 234,243        | 10,983           | 24        | 73,751         | 3,458          | 14,441           |
| Potassium Dimethyldithiocarbamate  | NR       | NR             | NR               | 1         | 12,341         | 11,519         | 11,519           |
| Mercury and Mercury Compounds      | 32       | 37             | 4,289            | 41        | 24             | 2,798          | 7,087            |
| Copper and Copper Compounds        | 5        | 2,539          | 1,612            | 5         | 1,424          | 904            | 2,516            |
| Vanadium and Vanadium Compounds    | 25       | 43,253         | 1,514            | 9         | 8,447          | 296            | 1,809            |
|                                    |          |                | <b>2,906,906</b> |           |                | <b>143,581</b> | <b>3,050,487</b> |

Source: *TRIReleases2002*.

NR - Not Reported.

The largest contributor to the TWPE for both Phase I and Phase II is dioxins, which account for 95% of the Phase I TWPE and 92% of the Phase II TWPE.

EPA met with AF&PA and NCASI April 5, 2005. Prior to that meeting, EPA provided AF&PA with a spreadsheet listing the category's 2002 TRI-reported discharges [15]. Following the meeting, EPA revised its estimates of toxic-weighted TRI-reported discharges, in part because of information provided by AF&PA. The data presented in Table 5-1 reflect EPA's revised estimates. As discussed in more detail later in this section, EPA's revisions included developing a category-specific TWF for PACs discharged by pulp and paper mills and correcting the dioxin congener distribution for one mill [1].

At the time of the April 5 meeting, EPA estimated that dioxins releases amounted to 2.8 million TWPE, accounting for 90% of the category TWPE. Using a worst-case assumption that all PACs discharged by the category were benzo(a)pyrene, EPA estimated that PACs releases amounted to 140,733 TWPE, accounting for 4% of the category TWPE. To provide EPA with a better understanding of the basis for mill-reported releases, NCASI contacted the 9 mills with the highest reported dioxins releases, the 10 mills with the highest reported PACs releases, and also provided EPA with information from *NCASI's Handbook of Chemical-Specific Information for SARA Section 313 Form R Reporting* (SARA Handbook) [6]. In EPA's April 5 estimates of TRI-reported toxic discharges, lead, manganese, and other metals, ranked below dioxins and PACs in total category TWPE. Because these pollutants contributed less to EPA's earlier estimates of the category TWPE, AF&PA did not provide EPA with information about how mills estimate releases of metals and metal compounds.

## **5.2 TRI-Reported Dioxins Releases**

NCASI contacted 9 of the 10 mills that reported the largest dioxins releases for 2002 (one mill, Durango, has closed and was not contacted). Table 5-2 presents the information about these mills that NCASI provided to EPA [16]. Six of the nine mills contacted by NCASI estimated their discharges based on information contained in the SARA Handbook. One mill

(Blandin) used a mass balance developed using SARA Handbook factors combined with its chemical analysis of untreated wastewater.

Two mills, both in Phase I, used monitoring data to estimate their 2002 TRI-reported dioxins discharges. Kimberly-Clark, Everett, WA has monitoring data for TCDF, but (as reported by NCASI) subtracts the contribution from its water supply. Bowater, Catawba, SC had effluent monitoring data, including detected concentrations of TCDD and TCDF<sup>5</sup> and detected concentrations of other congeners. (As previously noted, Bowater has not detected TCDD or TCDF in its effluent above the Method 1613B ML since 2002.) AF&PA provided EPA with the monitoring data Bowater used to estimate its 2002 TRI release [17]. Using these monitoring data, EPA adjusted the congener distribution used to calculate the mill-specific dioxins TWF. This adjustment reduced the estimated TWPE for the Bowater discharges.

Most of the mills contacted by NCASI used dioxins concentrations presented in SARA Handbook *Table 14 (PCDD/F Concentrations in Eight ECF Bleached Chemical Pulp Mill Treated Effluents (NCASI 2002))* [18] to estimate their releases. The mills used the total CDD/Fs value of 88.2 pg/L, a sum calculated using zero for congeners not detected [16]. The mills multiplied their annual wastewater discharge flow by this concentration to calculate the annual mass discharge reported to TRI.

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<sup>5</sup>Bowater Catawba, SC provided a table showing that it detected 2.7 pg/L TCDD and 2.1 pg/L TCDF in mill effluent. Both concentrations are less than the Method 1613B ML (minimum level) of 10 pg/L [17].

**Table 5-2. Dioxin and Dioxin-Like Compound Releases to Water Reported in TRI by Top 10 Mills for Reporting Year 2002**

| Facility and Location                                       | Basis for Report   | Annual Wastewater Flow<br>(million gallons/yr) | Effluent Concentration<br>Used for Reporting (pg/L) | Release to Water<br>Reported (lb/yr) |
|---|--|--|---|--------------------------------------|
| Kimberly-Clark Worldwide Inc.,<br>Everett, WA               | Mill used process mass<br>balance.   | –  | –   | 0.0180                               |
| Fort James Operating Co.,<br>Pennington, AL                 | Mill used NCASI factors [18].  | 15,950.5                                       | 88.2  | 0.0117                               |
| Georgia-Pacific Crossett Paper<br>Ops., Crossett, AR        | Mill used NCASI factors [18].  | 14,801   | 88.2  | 0.0109                               |
| Potlatch Corp. Idaho Pulp &<br>Paperboard, Lewiston, ID     | Mill used NCASI factors [18].  | 12,472   | 88.2  | 0.00941                              |
| Bowater Inc. Coated & Specialty<br>Papers Div., Catawba, SC | Effluent analyses [17].  | 7,738  | 121.9   | 0.00806                              |
| Fort James Camas L.L.C., Camas,<br>WA                       | Mill used NCASI factors [18].  | 10,728   | 88.2  | 0.0079                               |
| Durango-Georgia Paper Co., St.<br>Marys, GA                 | Mill is closed, NCASI did not<br>contact.  | NA   | NA  | 0.00745                              |
| Georgia-Pacific Corp. Port Hudson<br>Ops., Zachary, LA      | NCASI factors (estimated<br>using NCASI Handbook Table<br>12 - for non-ECF mills) [19].  | 8,293  | 105.7   | 0.00731                              |
| Blandin Paper Co., Grand Rapids,<br>MN                      | Actual data for untreated<br>wastewater less contributions<br>from raw water (SARA<br>Handbook Table 17) and clay<br>(SARA Handbook Table 20)<br>[20]. |  |   | 0.0414                               |
| Domtar Maine Corp., Baileyville,<br>ME                      | NCASI factors [18].  | 9,437.5  | 88.2  | 0.00695                              |

Source: NCASI, April 29, 2005 [16].

NA -Not Applicable.

In addition to the amount of each toxic chemical released, facilities are required to report to TRI the method used to estimate the releases. Table 5-3 presents the methods for estimating dioxins releases reported by pulp mills. TRI defines the estimation methods presented in the table as follows:

- M - Monitoring Data or Direct Measurement: An accurate method for developing chemical releases. Monitoring required to be performed under the Cluster Rules or other regulations should be available for developing estimates. If only a small amount of direct measurement data are available or the data are not representative, another technique may give a more accurate result.
- E - Emission Factor: A representative value that attempts to relate the quantity of a chemical released with an associated activity. These factors are usually expressed as the weight of chemical released divided by a unit weight, volume, distance, or duration of activity releasing the chemical (e.g., pounds of chemical released per pound of product produced).
- C - Mass Balance: Calculation method to determine the amount of chemical entering and leaving an operation. Most useful for chemicals that do not become part of the final product, such as catalysts. For large inputs and outputs, such as wastewater flow, a mass balance may not be the best estimation method. Slight uncertainties in mass calculation can yield significant errors in the release or other waste management activities.
- O - Engineering Calculation: Assumptions and/or judgements used to estimate quantities of chemical released. The quantities are estimated by using physical and chemical properties and relationships or by modifying an emission factor to reflect the chemical properties of the chemical in question.

As shown in Table 5-3, 53% of Phase I mills and no Phase II mills which reported dioxins releases reported using emission factors to estimate their releases.

**Table 5-3. Number of Mills' TRI Estimation Techniques for Mills Reporting Non-Zero Dioxins Discharges**

| Estimation Method                        | Phase I   |         | Phase II |         |
|--|-----------|---------|----------|---------|
|  | Number    | Percent | Number   | Percent |
| Engineering Calculations (O)             | 8         | 19%     | 4        | 44%     |
| Direct Measurement (M)                   | 10        | 23%     | 2        | 22%     |
| Emission Factor (E)                      | 23        | 53%     | -        | -       |
| Mass Balance (C)                         | 2         | 5%      | 3        | 33%     |
| <b>Total Number of Reported Releases</b> | <b>43</b> |         | <b>9</b> |         |

Source: *TRIReleases2002*.

### 5.3 Comparison of TRI and PCS Dioxins Discharge Data

Table 5-4 compares TRI and PCS data for the number of mills reporting non-zero dioxins discharges and the mass released. For TRI, 47 Phase I and 15 Phase II mills reported releases of a total of 68.6 grams of dioxin and dioxin-like compounds in 2002. In contrast, PCS contains data for only one mill (Bowater, Catawba, SC) that reported final effluent discharge of either TCDD or TCDF. Based on PCS data, EPA estimated that the Bowater Catawba mill discharged 0.88 grams of TCDD in 2002.

**Table 5-4. Comparison of TRI and PCS; Number of Mills Reporting Non-Zero Releases and Mass of Dioxins Released**

|   |                 | Phase I | Phase II |
|---|-----------------|---------|----------|
| <b><i>TRIReleases2002</i></b>   |                 |         |          |
| Mills reporting dioxin and dioxin-like compounds greater than zero <sup>a</sup> | Number of mills | 47      | 14       |
| Total reported category discharge <sup>b</sup>                                  | Grams/yr        | 60.4    | 5.9      |
| <b><i>PCSLoads2002</i></b>  |                 |         |          |
| Mills reporting TCDD greater than zero <sup>a</sup>                             | Number of mills | 1       | 0        |
| Total category discharge  | Grams/yr        | 0.88    | 0        |
| Mills reporting TCDF greater than zero <sup>a</sup>                             | Number of mills | 0       | 0        |
| Total category discharge  | Grams/yr        | 0       | 0        |

<sup>a</sup>Mills reporting discharge of zero are not presented.

<sup>b</sup>Indirect and direct discharges reported; indirect account for POTW removal (83% estimated for dioxin and dioxin-like compounds).

Bowater reported to TRI that they discharged 3.6 grams of dioxin and dioxin-like compounds in 2002. According to information provided by NCASI, this estimate was based on the average daily flow of 21.2 million gallons per day (MGD) and “total CDD/Fs” concentration of 121.9 pg/L [17]. Using concentration and flow information in PCS, EPA calculated that the mill discharged 0.88 grams of TCDD in 2002. The Bowater PCS discharge was the result of a single measurement (83.6 pg/L) above the method detection limit (10 pg/L). Because this concentration was measured on a quarterly reporting cycle, to calculate the annual discharge load (pounds/year), EPA assumed it represented the mill’s effluent concentration for three months.

Kimberly-Clark in Everett, WA had the largest 2002 TRI-reported releases of dioxins and dioxin-like compounds (8.19 grams), but no TCDD or TCDF data are reported to PCS for this mill.

Based upon discussions of the PCS reported load that EPA had with the mill and Washington Department of Ecology, there are two factors that contribute to the mill’s TCDF discharges. First, the Washington Department of Ecology, Kimberly-Clark, and EPA’s Chemical Engineering Branch have determined that the mill’s water intake contains unchlorinated TCDF precursors, and at certain times of the year TCDF formation occurs [21]. Second, the chlorination process used at the mill is atypical and has been shown to generate 2,3,7,8-TCDF, which transfers to the mill process water [16]. To quantify intake loadings, the mill collects TCDF measurements of the chlorinated process water. The mill’s NPDES permit contains Cluster Rules TCDD and TCDF bleach plant monitoring requirements and an allowance for TCDF periodic measurements above the method detection limit (10 pg/L). Compliance monitoring data were not contained in PCS, but were provided by the Washington Department of Ecology. Kimberly-Clark has measured TCDF in both the process water and bleach plant effluent from 2001 through 2005 [14]. EPA will continue to investigate TCDD and TCDF loads at the Everett mill.



## 5.4 TRI-Reported PACs

NCASI contacted the 10 mills that reported the largest PACs releases for 2002. Table 5-5 presents the information about these mills NCASI provided to EPA [16]. Seven of the nine mills for which NCASI obtained information estimated their discharges based on information contained in the SARA Handbook. The two remaining mills estimated releases based on results of chemical analysis of their wastewater. For both mills, concentrations of all PACs were less than analytical detection limits, but the mills used a fraction of the detection limit to estimate a pollutant mass discharged for TRI.

The mills that used the SARA Handbook to estimate their TRI releases used *Table 5 PAC Concentrations in Pulp Mill Effluents*. This table is reproduced as Table 5-6. NCASI explained that where mills chose to use the data in SARA Handbook *Table 5*, they used the value in the “TOTAL” column that corresponded to their pulping type.

EPA used the data from Table 5-6 to calculate a category-specific toxicity weighting factors (TWF) for PACs discharged by pulp and paper mills [1]. Because there are few bisulfite, chemi-thermo- mechanical pulp, and thermo-mechanical pulp mills compared to the number of kraft mills, EPA used the kraft mill concentrations to calculate the category PAC TWF.

**Table 5-5. PAC Releases to Water Reported in TRI by Top 10 Mills for Reporting Year 2002**

| <b>Facility and Location</b>                  | <b>Basis for Report</b>  | <b>Annual Wastewater Flow (million gallons/yr)</b> | <b>Effluent Concentration Used for Reporting (µg/L - unless otherwise stated)</b> | <b>Release to Water Reported (lb/yr)</b> |
|---|--|--|---|--|
| Groveton Paper Board, Inc., Groveton          | Mill believes it produces PACs in semi-chemical liquor combustion kiln that is fitted with a wet scrubber. Treated effluent analysis for 10 PACs made in conjunction with an NPDES Permit application showed all PACs analyzed (10 cmpds) were not detected at 5 ppb. Mill used 1 ppb for all analyzed PACs as the basis for reporting [22]. | 1,788.5  | 10 ppb (1 ppb for each of 10 PACs)  | 149.2                                    |
| Meadwestvaco Maryland Inc., Luke              | Mill used annual priority pollutant scan for which 8 PACs were reported to be not detected at a detection limit of 5.0 ppb. Mill used ½ of detection limit for reporting [23].   | 7,641.3  | 20 ppb (2.5 ppb for each of 8 PACs)   | 1,269.5 (transferred to POTW)            |
| Alabama River Pulp Co. Inc., Perdue Hill      | Mill used NCASI factors [24].  | 14,288.7 (kraft)<br>1,768.0 (TMP)                  | 0.213 (kraft)<br>0.789 (TMP)  | 39                                       |
| Rayonier Performance Fibers Jesup Mill, Jesup | Mill used NCASI factors [24].  | 20,576   | 0.213   | 37                                       |
| Weyerhaeuser Pulp Mill, Cosmopolis            | Mill used NCASI factors [24].  | 7,394  | 0.605   | 37                                       |
| Domtar Inds. Inc. Ashdown Mill, Ashdown       | Mill used NCASI factors [24].  | 20,121   | 0.213   | 35.7                                     |
| Monadnock Paper Mills, Inc., Bennington       | Mill has not responded to request for information.   |  |   |  |
| International Paper, Augusta                  | Mill used NCASI factors. Mill has since identified an error in the calculation and will be filing a correction.  |  |   | 32.1                                     |
| SP Newsprint Co. Newbert Mill, Newberg        | Mill used NCASI factors [24].  | 4,716  | 0.789   | 30.8                                     |
| International Paper Courtland Mill, Courtland | Mill used NCASI factors [24].  | 17,045.9   | 0.213   | 30.24                                    |

Source: NCASI, April 29, 2005 [16].

TMP - Thermo-mechanical pulp.

**Table 5-6. PAC Concentrations in Pulp Mill Effluents (H.-C. Lavellee, Inc. 1990)<sup>a</sup>**

| Pulping Type                    | N <sup>b</sup> | PAC ->                      | 1          | 2          | 3          | 4   | 5           | 6         | Total <sup>c</sup> |
|---------------------------------|----------------|-----------------------------|------------|------------|------------|-----|-------------|-----------|--------------------|
|                                 |                | Concentration (ppb or µg/L) |            |            |            |     |             |           |                    |
|                                 |                | MDL                         | 0.05       | 0.05       | 0.05       | 0.1 | 0.05        | 0.1       |                    |
| Kraft                           | 2              | Range                       |            |            |            |     | ND to Tr    |           |                    |
|                                 |                | Average                     | ND         | ND         | ND         | ND  | 0.038       | ND        | 0.213              |
| Bisulfite                       | 4              | Range                       | ND to 0.07 |            |            |     | ND to 1.6   |           |                    |
|                                 |                | Average                     | 0.036      | ND         | ND         | ND  | 0.419       | ND        | 0.605              |
| Chemical Thermo-mechanical Pulp | 4              | Range                       |            |            |            |     | ND to 0.055 |           |                    |
|                                 |                | Average                     | ND         | ND         | ND         | ND  | 0.033       | ND        | 0.208              |
| Thermomechanical Pulp           | 2              | Range                       |            | ND to 0.13 | ND to 0.65 |     | ND to 0.42  | ND to 0.1 |                    |
|                                 |                | Average                     | ND         | 0.078      | 0.338      | ND  | 0.223       | 0.075     | 0.789              |
| Fine Paper <sup>d</sup>         | 1              | Range                       | ND         | ND         | ND         | ND  | ND          | ND        |                    |
|                                 |                | Average                     |            |            |            |     |             |           | ND (0.40)          |

MDL - Method Detection Limit.

Tr - Trace (assumed equal to MDL).

ND - Not Detected.

<sup>a</sup>Only for mills that use chemicals containing trace quantities of PACs; PACs are not manufactured during pulping or bleaching (Young et al. 1990).

<sup>b</sup>Number of mills tested.

<sup>c</sup>Compounds reported as less than the detection limit have been included in the total at one-half the detection limit.

<sup>d</sup>Non-integrated mill.

**PACs in the Table:**

1 - Benzo(a)anthracene; 2 - Benzo(a)pyrene; 3 - Benzo(b+k)fluoranthene; 4 - Dibenzo(a,h)anthracene; 5 - Fluoranthene; 6 - Indeno(1,2,3-c,d)pyrene.

NCASI calculated the emission factors for the industry based on six PACs: benzo(a)anthracene, benzo(a)pyrene, benzo(b+k) fluoranthene, dibenzo(a,h)anthracene, fluoranthene, and indeno(1,2,3-c,d)pyrene. For the kraft mills, only fluoranthene was detected above the method detection limit; however, four of the other five compounds were detected above the method detection limit for the other pulping types. Because the calculated TWF will be used for all mills in the Pulp and Paper Category, EPA used one-half the detection limit for compounds that were not detected in kraft mill wastewaters. NCASI also calculated the emission factor using one-half the detection limit for compounds that were not detected. As shown in Table 5-1, when the PACs TWPE is calculated using the category-specific TWF, PACs account for the fourth highest TWPE of the TRI-reported chemical discharges for Phase I and

Phase II mills, comprising 1.5% of Phase I and Phase II TWPE. This is a significant change from the April 5, 2005 results, in which PACs comprised 4% of the Phase I and Phase II TWPE.

Table 5-7 presents the methods for estimating PACs releases reported by pulp and paper mills. As shown in Table 5-7, 77% of Phase I mills and 65% of Phase II mills that reported PACs releases reported using emission factors to estimate their releases.

**Table 5-7. Number of Mills Reporting PAC TRI Estimation Techniques, by Phase and Discharge Type**

|  | Phase I   |         | Phase II  |         |
|--|-----------|---------|-----------|---------|
|  | Number    | Percent | Number    | Percent |
| Engineering Calculations (O)             | 10        | 18%     | 8         | 31%     |
| Direct Measurement (M)                   | 3         | 5%      | 1         | 4%      |
| Emission Factor (E)                      | 44        | 77%     | 17        | 65%     |
| Mass Balance (C)                         | -         | -       | -         | -       |
| <b>Total Number of Reported Releases</b> | <b>57</b> |         | <b>26</b> |         |

Source: *TRI Releases 2002*.

Note: See descriptions of O, M, E, and C on page 5-6.

## 5.5 Metals and Other Chemicals Reported to TRI

As shown in Table 5-1, after dioxins, the pollutants with the largest TWPE reported discharged by Phase I and Phase II mills are lead and lead compounds and manganese and manganese compounds. A total of 185 Phase I and Phase II mills reported discharges of lead and lead compounds, more mills than reported discharges of any other pollutant. As it completes this detailed study, EPA will discuss with AF&PA and NCASI how mills estimate their TRI-reported discharges of these pollutants. EPA will also investigate technical literature to learn more about possible process sources of these wastewater pollutants.

Thirteen mills reported wastewater discharges of chlorine ( $\text{Cl}_2$ ). However, chlorine reacts very quickly with water to form  $\text{HOCl}$ ,  $\text{Cl}^-$ , and  $\text{H}^+$ . This is an equilibrium reaction (at a pH above 4, the equilibrium shifts almost completely toward formation of these products). Because pulp and paper mills discharge wastewater at between pH 7 and pH 9, EPA

expects no releases of chlorine ( $\text{Cl}_2$ ) in wastewater. As it completes this detailed study, EPA plans to investigate these chlorine releases and discuss them with industry.

## **6.0 STATUS OF THE DETAILED STUDY AND NEXT STEPS**

This report presents the preliminary results of EPA's detailed study of the pulp and paper industry. EPA began the study during its 2005 annual review of existing effluent guidelines and will complete the study during its 2006 annual review. The results of the study will be published with EPA's 2006 Effluent Guidelines Program Plan. EPA has prepared this preliminary report to provide the public opportunity to comment on the data collected to date and EPA's analysis of these data. In its Federal Register Notice of the Preliminary 2006 Effluent Guidelines Program Plan, EPA will request additional information about the pulp and paper industry to support the completion of this study.

EPA's progress in addressing the two main issues of this study and the steps it will take to continue the study are summarized in the following subsections:

- Section 6.1: Analysis of the Implementation and Impact of the Cluster Rules;
- Section 6.2: Investigation of the Non-bleaching Sources of Toxic and Nonconventional Pollutants; and
- Section 6.3: Requests for Additional Information.

### **6.1 Analysis of the Implementation and Impact of the Cluster Rules**

EPA has made substantial progress in determining how the 1998 Cluster Rules have been implemented and their effect on mill discharges.

EPA collected 73 permits applicable to Phase 1 mills and reviewed them to determine if they were developed using Cluster Rules effluent limitations guidelines. EPA received another five permits after completing of the analyses described in this preliminary report. EPA found that most of the permits it analyzed followed the Cluster Rules guidelines, though at least seven permits issued after April 15, 1998 did not. To complete the detailed study, EPA will:

- Analyze late-arriving permits; and
- Contact the state staff that developed the seven permits that do not incorporate the guidelines to understand how they were developed.

EPA analyzed data available in PCS to assess the impact of the Cluster Rules on wastewater discharges. As discussed in Section 4.0, for mills with data available in PCS, EPA found that by 2004, almost all of them met Cluster Rules concentration-based guidelines for TCDD, TCDF, and chlorinated phenolic compounds. For pollutants with mass-based guidelines, EPA found that the majority of mills discharged less than EPA's estimated baseline loads (pounds/year). However, EPA found that data for Cluster Rules pollutants were missing from PCS for many mills. To complete the detailed study, EPA will:

- Contact mills that EPA identified as discharging pollutant loads (pounds/year) much greater than EPA's baseline estimate. These include three mills with chloroform loads above baseline and one mill for which PCS data indicate the AOX load was much higher in one year than in other years. EPA will contact the mills to verify that the data in PCS are correct.
- Discuss with EPA's Office of Enforcement and Compliance Assurance (OECA) the permit-required monitoring data that are missing from PCS. OECA is responsible for maintaining PCS.
- Discuss with state permitting authorities the permit-required monitoring data that are missing from PCS. States are responsible for loading Discharge Monitoring Report (DMR) data into PCS.
- Correct the identification of mill outfalls using information provided by industry or others, and update the analysis of industry discharges.

## **6.2 Investigation of the Non-bleaching Sources of Toxic and Nonconventional Pollutants**

EPA has not yet focused on investigating non-bleaching sources of toxic pollutants (dioxins, PACs, metals, ammonia, and possibly others). Non-bleaching sources include discharges from Phase II mills as well as non-bleaching sources at Phase I mills, such as papermaking and recovery operations. As of July 2005, EPA had analyzed TRI-reported

discharges of dioxins and PACs, by reviewing information provided by AF&PA. In addition, EPA has made a preliminary analysis of nutrient (nitrogen- and phosphorus-containing parameters) discharges reported in PCS. EPA found that the Pulp and Paper Category ranked high in both nitrogen and phosphorus discharges reported to PCS [25]. To complete the detailed study, EPA will:

- Discuss with AF&PA and NCASI how Phase I and Phase II mills estimate TRI-reported releases of toxic pollutants other than dioxins and PACs, particularly lead, manganese, zinc, and other metals.
- Contact mills with high TRI-reported releases of toxic compounds (including the one mill that reported releases of potassium dimethyldithiocarbamate) to understand how they estimated their releases.
- Further analyze nitrogen and phosphorus data in PCS, including the reported concentrations and locations of mills that report nutrient discharges.
- Investigate the process sources and potential control technologies for nitrogen and phosphorus discharged by pulp and paper mills.
- Review technical literature focusing on:
  - Spent pulping liquor from unbleached kraft mills and papermachine additives and coatings, which are potential sources of toxic pollutant releases,
  - Wastewater pollutants derived from combustion-related activities,
  - Applicability, performance, and cost of nitrogen and phosphorus control technologies used in the pulp and paper industry,
  - Changes in the production process implemented so mills will comply with the Cluster Rules, to identify process improvements or additional pollution prevention programs implemented since 1998 and compile the available information on the pollutant reductions, and
  - EPA's National Listing of Fish Advisories (NLFA) which presents the current status of advisories against consuming dioxin-tainted fish. The NLFA provides tracking information from 1993 to the present. EPA will compare current fish advisories to the fish consumption advisories in place at the time of the 1998 ELGs revision.



### **6.3                    Requests for Additional Information**

This subsection presents the requests for additional information that EPA will make in its Federal Register Notice of the Preliminary 2006 Effluent Guidelines Program Plan.

As discussed in Section 4.0, to evaluate the implementation of the Cluster Rules, EPA reviewed pipe and outfall descriptions contained in PCS for bleached papergrade kraft and papergrade sulfite mills (Phase I mills). EPA identified these pipes and outfalls as bleach plant effluent, final effluent, or other type of monitoring location. EPA requests that operators of these Phase I mills verify EPA's identification of their PCS monitoring locations listed in Appendix A of this report.

Some permits require in-process monitoring (bleach plant effluent monitoring) but the permitting authority (state) does not include in-process monitoring results in PCS. EPA requests that operators of bleached papergrade kraft or papergrade sulfite mills provide results of their permit-required (or other) bleach plant effluent monitoring, where these monitoring results are missing from PCS.

As presented in Section 5.0, EPA reviewed the information provided by AF&PA and its member companies regarding the measurement techniques used to calculate TRI-reported toxic discharges at 19 individual Phase I mills. EPA requests additional details of methods used to estimate releases of toxic pollutant discharges reported to TRI, in particular those methods used by Phase II mills (mills without bleached papergrade kraft or papergrade sulfite operations) to estimate releases of dioxins, PACs, and toxic metals.

EPA requests information about non-bleaching sources of toxic wastewater pollutants, such as pollutants derived from combustion-related activities, spent pulping liquor from unbleached kraft mills, and papermachine additives and coatings.

EPA requests examples (i.e., case studies) of mill process changes implemented in response to the Cluster Rules, including the wastewater pollution reduction benefits of

installing best available control technologies (BAT) and using best management practices (BMPs) for the control of spent pulping liquor losses.

## 7.0 REFERENCES

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## **Appendix A**

### **PCS DISCHARGE LOCATIONS AND EPA DESIGNATED PIPE USAGE**

## **Appendix A**

### **PCS Discharge Locations and EPA Designated Pipe Usage**

The attached table lists National Pollutant Discharge Elimination System (NPDES) permits that EPA is reviewing as part of the pulp and paper detailed study. The permits listed are for Phase I mills (mills with wastewater discharges that meet the applicability of 40 CFR 430 Subpart B (Bleached Papergrade Kraft and Soda) and Subpart E (Papergrade Sulfite). Permits for four POTWs receiving significant amounts of pulp mill wastewater are also included. The table includes the following:

- **Mill NPDES ID number;**
- **Discharge Pipe** - numbers that appear in PCS for each NPDES permit. For example, NPDES AL000396 has 12 discharge pipes, numbered 1 through 12.
- **Designated Pipe Usage** - EPA's best guess at the usage of the discharge pipe. EPA has designated pipes and outfalls as:
  - FE - Final Effluent;
  - BE - Bleach Plant; or
  - OOS - Out of Scope. Out of scope pipes include stormwater runoff, non-contact cooling water, emergency overflow, etc;
- **Evidence** - a code for the evidence that EPA used to categorize the discharge pipe. EPA used permits and PIPE descriptions contained in the PCS database to designate location. If these two resources provided insufficient information to identify the discharge pipe, EPA used the pollutant discharged as indicator. For example, the Cluster Rules require final effluent AOX monitoring. Absent additional information, the presence of AOX indicates final effluent. EPA used the following codes to describe the evidence it used to categorize the discharge pipe:
  - 1 - permit;
  - 2- PCS pipe description; or
  - 3- pollutant as an indicator.
- **Pipe or Outfall Description** - taken from PCS or the NPDES permit.

EPA requests operators of the mills listed in Appendix A confirm the monitoring location designations.

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description       |
|---------------|-----------------------------|---|-----------------------|-----------------------------------|
| AL0000396     | 001                         | BP  | 2                     | 2003 PERMIT NO 1/2 HARDWOOD       |
| AL0000396     | 001                         | BP  | 2                     | 2003 PERMIT NO 3 SOFTWOOD         |
| AL0000396     | 001                         | FE  | 2                     | COMBINED PROCESS & SANITARY       |
| AL0000396     | 001                         | BP  | 3                     | BP in 2002 and prior              |
| AL0000396     | 002                         | OOS                                       | 2                     | STORM WATER SEMI-ANNUAL           |
| AL0000396     | 003                         | OOS                                       | 2                     | STORM WATER SEMI-ANNUAL           |
| AL0000396     | 004                         | OOS                                       | 2                     | STORM WATER SEMI-ANNUAL           |
| AL0000396     | 005                         | OOS                                       | 2                     | STORM WATER SEMI-ANNUAL           |
| AL0000396     | 006                         | OOS                                       | 2                     | STORM WATER SEMI-ANNUAL<br>REPORT |
| AL0000396     | 007                         | OOS                                       | 2                     | SEMI-ANNUAL<br>MONITORING/REPORTI |
| AL0000396     | 008                         | OOS                                       | 2                     | STORM WATER SEMI-ANNUAL<br>REPORT |
| AL0000396     | 009                         | OOS                                       | 2                     | COMBINED STORM WATER 002 &<br>003 |
| AL0000396     | 010                         | OOS                                       | 2                     | COMBINED STORM WATER 004-006      |
| AL0000396     | 011                         | OOS                                       | 2                     | RIVER INTAKE PUMP FILTER SC BW    |
| AL0000396     | 012                         | OOS                                       | 2                     | 2003 PERMIT ANNUAL                |
| AL0002682     | 001                         | BP  | 2                     | BLEACH PLT ALK 001A/B REPORTIN    |
| AL0002682     | 002                         | FE  | 2                     | OXIDATION POND EFFLUENT           |
| AL0002755     | 001                         | FE  | 2                     | PROCESS & NON-CONTACT<br>WSTWTR   |
| AL0002755     | 001                         | BP  | 2                     | BLEACH PLANT INTERNAL<br>DISCHARG |
| AL0002755     | 001                         | BP  | 3                     | BP in 2000 and prior              |
| AL0002755     | 002                         | OOS                                       | 2                     | DSN002 STORMWATER ANNUAL          |
| AL0002780     | 001                         | FE  | 2                     | PROCESS WASTEWATER<br>DISCHARGE   |
| AL0002780     | 002                         | OOS                                       | 2                     | WOODYARD STORM DRAINAGE           |
| AL0002780     | 003                         | OOS                                       | 2                     | DSN003 STORMWATER                 |
| AL0002780     | 004                         | OOS                                       | 2                     | STORM WATER                       |
| AL0002780     | 005                         | OOS                                       | 2                     | STORM WATER SEMI-ANNUAL<br>REPORT |
| AL0002780     | 006                         | OOS                                       | 2                     | STORM WATER                       |
| AL0002780     | 009                         | OOS                                       | 2                     | STORM WATER                       |



### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description   |
|---------------|-----------------------------|---|-----------------------|---|
| AL0002780     | 010                         | OOS                                       | 2                     | FIRE & STORM WATER, STEAM CON   |
| AL0002780     | 011                         | OOS                                       | 2                     | STORM WATER   |
| AL0002780     | 012                         | OOS                                       | 2                     | STORM WATER VARIOUS AREAS   |
| AL0002780     | 013                         | OOS                                       | 2                     | STORM WATER   |
| AL0002780     | 014                         | OOS                                       | 2                     | STORM WATER   |
| AL0002801     | 001                         | FE  | 2                     | TIER I LIMITS   |
| AL0002801     | 002                         | OOS                                       | 2                     | DSN002 STORM WATER NON-<br>PROCESS  |
| AL0002801     | 003                         | OOS                                       | 2                     | STORMWATER<br>(UNCONTAMINATED)  |
| AL0002801     | 004                         | OOS                                       | 2                     | DSN004 STORM WATER NON-<br>PROCESS  |
| AL0002801     | 007                         | OOS                                       | 2                     | NONCONTACT COOLING WATER  |
| AL0002801     | 008                         | OOS                                       | 2                     | EMERGENCY BYPASS.   |
| AL0002801     | 009                         | OOS                                       | 2                     | DSN009 STORM WATER<br>WOODYARD  |
| AL0002801     | 010                         | OOS                                       | 2                     | STORMWATER<br>(UNCONTAMINATED)  |
| AL0002801     | 012                         | OOS                                       | 2                     | STORM WATER   |
| AL0002801     | 013                         | OOS                                       | 2                     | DSN013 STORM WATER NON-<br>PROCESS  |
| AL0002801     | 019                         | OOS                                       | 2                     | DSN019 STORM WATER NON-<br>PROCESS  |
| AL0002801     | 021                         | OOS                                       | 2                     | DSN021 STORM WATER  |
| AL0002801     | 022                         | OOS                                       | 2                     | STORM WATER VARIOUS AREAS   |
| AL0002828     | 001                         | BP  | 2                     | DSN001A BLEACH PLANT<br>INTERNAL  |
| AL0002828     | 001                         | BP  | 2                     | DSN001B BLEACH PLANT<br>INTERNAL  |
| AL0002828     | 001                         | BP  | 3                     | BP in 2000 and prior  |
| AL0002828     | 001                         | FE  | 2                     | PROCESS   |
| AL0002828     | 005                         | OOS                                       | 2                     | ASH POND & AIR SCRUBBER   |
| AL0002828     | 006                         | OOS                                       | 2                     | STORM WATER   |
| AL0003018     | 002                         | FE  | 1                     | PROC, SANTRY STRMWTR DSN 002  |
| AL0003018     | 003                         | BP  | 1                     | DRID (A = No. 1 (Hardwood) Bleach<br>plant internal requirement; B = No. 2<br>(Softwood) Bleach plant internal<br>requirement |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description   |
|---------------|-----------------------------|---|-----------------------|---|
| AL0003018     | 004                         | OOS                                       | 2                     | STORMWATER QUARTERLY REPORTING  |
| AL0003018     | 005                         | OOS                                       | 2                     | STORMWATER QUARTERLY REPORTING  |
| AL0003018     | 006                         | OOS                                       | 2                     | STORMWATER QUARTERLY REPORTING  |
| AL0003018     | 007                         | OOS                                       | 2                     | STORMWATER NO MONITORING/REPOR  |
| AL0003018     | 008                         | OOS                                       | 2                     | DSN008 STORMWATER NO MONTI/REP  |
| AL0003018     | 011                         | OOS                                       | 2                     | DSN011 STORMWATER   |
| AL0003158     | 001                         | BP  | 2                     | DSN001D BEGIN 040101  |
| AL0003158     | 001                         | BP  | 2                     | DSN001E BEGIN 040101  |
| AL0003158     | 001                         | BP  | 3                     | BP in 2002 and prior  |
| AL0003158     | 001                         | FE  | 2                     | PROCESS WASTEWATER  |
| AL0003158     | 002                         | OOS                                       | 1                     | NC COOLING/ASH POND OF/STORM  |
| AL0003158     | 003                         | OOS                                       | 1                     | DSN003 SEMI ANNUAL MONITORING;  |
| AL0003158     | 004                         | OOS                                       | 1                     | DSN003 SEMI ANNUAL MONITORING;  |
| AL0003158     | 006                         | OOS                                       | 1                     | DSN006 STORMWATER SEMI-ANNUAL;  |
| AL0003301     | 001                         | BP  | 2                     | DSN001A BLEACH PLANT INTERNAL   |
| AL0003301     | 001                         | BP  | 2                     | DSN001B BLEACH PLANT INTERNAL   |
| AL0003301     | 001                         | BP  | 3                     | BP in 2000 and prior  |
| AL0003301     | 001                         | FE  | 2                     | DSN001 AOX REPORTING  |
| AL0003301     | 001                         | FE  | 2                     | PROCESS   |
| AL0003301     | 002                         | OOS                                       | 1                     | LANDFILL STORMWTR W/O LEACHATE  |
| AL0003301     | 003                         | OOS                                       | 1                     | LANDFILL STORMWTR W/O LEACHATE  |
| AL0025968     | 001                         | BP  | 1                     | Alkaline discharge into the effluent treatment system from the Alabama Pine Pulp (APP) bleach line  |
| AL0025968     | 001                         | BP  | 1                     | Alkaline discharge into the effluent treatment system from the Alabama River Pulp (ARP) bleach line |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill NPDES | Discharge Pipe (DSCH) | EPA Designated Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description  |
|------------|-----------------------|--|-----------------------|--|
| AL0025968  | 001                   | BP                                     | 3                     | BP in 2001 and prior   |
| AL0025968  | 001                   | FE                                     | 2                     | TOTAL FACILITY DISCHARGE   |
| AL0025968  | 001                   | BP                                     | 1                     | Acid discharge into the effluent treatment system from the APP bleach line |
| AL0025968  | 001                   | BP                                     | 1                     | Acid discharge into the effluent treatment system from the ARP bleach line |
| AL0025968  | 002                   | OOS                                    | 2                     | RIVER WATER FROM CYCLONE SEPAR   |
| AL0025968  | 003                   | OOS                                    | 2                     | DSN003 ANNUAL STORM WATER  |
| AL0025968  | 004                   | OOS                                    | 2                     | OVERFLOW TREATED MILL FRESH WA   |
| AL0025968  | 005                   | OOS                                    | 2                     | 2002 PERMIT ANNUAL; WAST=03  |
| AL0025968  | 006                   | OOS                                    | 2                     | 2002 PERMIT ANNUAL; WAST=03  |
| AR0001210  | 001                   | FE                                     | 1                     | QUARTERLY REPORTING  |
| AR0001210  | 002                   | OOS                                    | 2                     | CONTROLLED DSCH FROM MOSSY LK  |
| AR0001210  | 101                   | BP                                     | 1                     | 101-MONTHLY-LINE 1A HARD WOOD  |
| AR0001210  | 102                   | BP                                     | 1                     | 102-MONTHLY-LINE 1B HARD WOOD  |
| AR0001210  | 103                   | BP                                     | 1                     | 103-MONTHLY-LINE 2 SOFT WOOD   |
| AR0001210  | SMS                   | OOS                                    | 2                     | SMS002-DOWNSTREAM MONITORING   |
| AR0001210  | TX1                   | OOS                                    | 2                     | 001-QUARTERLY-CHRONIC TOXICITY   |
| AR0001601  | 001                   | OOS                                    | 1                     | TOTAL FACILITY OUTFALL   |
| AR0001601  | 002                   | OOS                                    | 2                     | 002-MONTHLY-EMERGENCY OVERFLOW   |
| AR0001601  | SUM                   | OOS                                    | 2                     | 001 & 002 COMBINED   |
| AR0001601  | TX1                   | OOS                                    | 2                     | 001-SEMIANNUAL-ACUTE TOXICITY  |
| AR0002968  | 001                   | FE                                     | 1                     | PROCESS/SANI WW; CONTAM. STORM   |
| AR0002968  | 01A                   | BP                                     | 1                     | 01A-INTERNAL-LINE 1A-HARDWOOD  |
| AR0002968  | 01B                   | BP                                     | 1                     | 01B-INTERNAL-LINE 1B-HARDWOOD  |
| AR0002968  | 01C                   | BP                                     | 1                     | 01C-INTERNAL-LINE 2-SOFTWOOD   |
| AR0002968  | TX1                   | OOS                                    | 2                     | CHRONIC TOXICITY REPORTS   |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description       |
|---------------|-----------------------------|---|-----------------------|-----------------------------------|
| AR0035823     | 001                         | FE  | 1                     | TOTAL FACILITY DISCHARGE          |
| AR0035823     | 002                         | OOS                                       | 2                     | 002-MONTHLY-WTR TRMT TNK<br>BOTTM |
| AR0035823     | 003                         | OOS                                       | 2                     | 003-MONTHLY-RUNOFF & COOLING      |
| AR0035823     | 004                         | OOS                                       | 2                     | 004-MONTHLY-SAND FLTR<br>BACKWASH |
| AR0035823     | 101                         | BP  | 1                     | 101-INTERNAL-BLEACH PLANT         |
| AR0035823     | TX1                         | OOS                                       | 2                     | 001-QUARTERLY-ACUTE TOXICITY      |
| CA0004065     | 001                         | FE  | 2                     | NON-SEASONAL PARAMETERS           |
| CA0005894     | 001                         | FE  | 1                     | PULPMILL 001/MONTHLY              |
| CA0005894     | 101                         | BP  | 1                     | WTR PLANT 101/MONTHLY             |
| CA0005894     | 201                         | OOS                                       | 2                     | WTR SUPPLY/MONTHLY                |
| CA0005894     | INF                         | OOS                                       | 2                     | INFLUENT/MONTHLY                  |
| FL0002526     | 001                         | FE  | 1                     | PROCESS AND BLOWDOWN<br>DISCHARGE |
| FL0002631     | 001                         | FE  | 2                     | TOTAL FACILITY DISCHARGE          |
| FL0002763     | 001                         | FE  | 1                     | PERMIT MONITORING POINT A         |
| FL0002763     | 002                         | OOS                                       | 1                     | MONITORING POINT C                |
| FL0002763     | 003                         | BP  | 1                     | INSTREAM MONITORING POINT R3      |
| FL0020206     | 001                         | FE  | 2                     | TREATED WASTEWATER                |
| GA000195      | 001                         | OOS                                       | 3                     |                                   |
| GA000195      | 002                         | OOS                                       | 3                     |                                   |
| GA000279      | 001                         | FE  | 1                     | PROCESS WASTEWATER                |
| GA000279      | 006                         | BP  | 1                     | ** BLEACH PLANT EFFLUENT          |
| GA000280      | 001                         | FE  | 1                     | ANNUAL                            |
| GA000280      | 010                         | OOS                                       | 3                     | QUARTERLY.....                    |
| GA000365      | 001                         | FE  | 1                     | TIDAL DISCHARGE 001               |
| GA000365      | 002                         | OOS                                       | 2                     | PARSHALL FLUME                    |
| GA000365      | 003                         | BP  | 1                     | BLEACH PLNT #1                    |
| GA000365      | 004                         | BP  | 1                     | BLEACH PLNT # 2                   |
| GA000365      | 005                         | BP  | 1                     | BLEACH PLNT # 3                   |
| GA000365      | 010                         | OOS                                       | 3                     | ** 001-TREATED PROCESS WATER**    |
| GA000365      | 011                         | OOS                                       | 2                     | NONCNT COOLWTR#008,018,019,020    |
| GA000365      | 020                         | OOS                                       | 2                     | ** 002 TPW--PARSHALL FLUME ***    |
| GA000365      | 021                         | OOS                                       | 2                     | CAR WASH                          |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description       |
|---------------|-----------------------------|---|-----------------------|-----------------------------------|
| GA000365      | 030                         | OOS                                       | 2                     | OUTFALL 003 BLEACH PLNT. # 1      |
| GA000365      | 050                         | OOS                                       | 2                     | OUTFALL 005 BLEACH PLNT. # 2      |
| GA000365      | 0A0                         | OOS                                       | 3                     |                                   |
| GA000365      | 0B0                         | OOS                                       | 3                     |                                   |
| GA004933      | 001                         | FE  | 1                     | Process Wastewater                |
| GA004933      | 0A0                         | OOS                                       | 3                     |                                   |
| ID0001163     | 001                         | FE  | 1                     | 001 DSCHG UNDER LOW FLOW          |
| KY0000086     | 001                         | FE  | 1                     | PROCESS WASTEWATER                |
| KY0000086     | 002                         | OOS                                       | 2                     | UPSTREAM STORMWATER<br>MONITORING |
| KY0000086     | 003                         | OOS                                       | 2                     | DOWNSTREAM STORMWATER<br>MONITORG |
| KY0000086     | 004                         | OOS                                       | 2                     | STORMWATER RUNOFF FROM<br>LANDFIL |
| KY0000086     | BP0                         | BP  | 2                     | BLEACH PLANT EFFLUENT             |
| KY0001716     | 001                         | FE  | 2                     | FINAL EFFLUENT LIMITS             |
| KY0001716     | 002                         | OOS                                       | 2                     | PROCESS WATER (CORRUGATED)        |
| KY0001716     | 003                         | OOS                                       | 2                     | STORMWATER RUNOFF                 |
| KY0001716     | 004                         | OOS                                       | 2                     | STORMWATER RUNOFF                 |
| KY0001716     | 005                         | OOS                                       | 2                     | STORMWATER RUNOFF                 |
| KY0001716     | 006                         | OOS                                       | 2                     | STORMWATER RUNOFF                 |
| KY0001716     | 007                         | OOS                                       | 2                     | STORMWATER RUNOFF                 |
| KY0001716     | 008                         | OOS                                       | 2                     | STORMWATER RUNOFF                 |
| KY0001716     | BP0                         | BP  | 2                     | BLEACH PLANT #2 INTERNAL<br>POINT |
| LA0003468     | 001                         | FE  | 2                     | PROCESS WASTEWATER                |
| LA0003468     | 009                         | OOS                                       | 2                     | INTAKE WATER TREATMENT<br>PLANT   |
| LA0003468     | 010                         | OOS                                       | 2                     | STORM WATER RUNOFF                |
| LA0003468     | 011                         | OOS                                       | 2                     | STORM WATER RUNOFF                |
| LA0003468     | 012                         | OOS                                       | 2                     | STORM WATER RUNOFF                |
| LA0003468     | 013                         | OOS                                       | 2                     | PLANT SITE STORMWATER             |
| LA0003468     | 014                         | OOS                                       | 2                     | STORM WATER RUNOFF                |
| LA0003468     | 015                         | OOS                                       | 2                     | PLANT SITE STORMWATER             |
| LA0003468     | 016                         | OOS                                       | 2                     | PLANT SITE STORMWATER             |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description        |
|---------------|-----------------------------|---|-----------------------|------------------------------------|
| LA0003468     | 017                         | OOS                                       | 2                     | STORM WATER RUNOFF                 |
| LA0003468     | 101                         | BP  | 2                     | BLEACH PLANT EFFLUENT              |
| LA0003468     | TX1                         | OOS                                       | 2                     | 10/02-12/02 DMR TOXIC RPT          |
| LA0005258     | 001                         | FE  | 1                     | TREATED PROCESS WASTEWATER         |
| LA0005258     | 002                         | OOS                                       | 1                     | PLANT SITE STORMWATER              |
| LA0005258     | 101                         | BP  | 1                     | Bleach Plant No.1                  |
| LA0005258     | 201                         | BP  | 1                     | Bleach Plant No.2                  |
| LA0005258     | 301                         | BP  | 1                     | Bleach Plant No.3                  |
| LA0005258     | SUM                         | OOS                                       | 2                     | SUM OF OUTFALL 001 & 003           |
| LA0005258     | TX1                         | OOS                                       | 2                     | WHOLE EFFLUENT TOXICITY            |
| LA0007561     | 001                         | FE  | 1                     | TREATED PROCESS WASTEWATER         |
| LA0007561     | 101                         | OOS                                       | 2                     | WASTEWATER FROM WHAM<br>BRAKE      |
| LA0007561     | 202                         | BP  | 1                     | WASTEWATER FROM A-LINE<br>BLEACH   |
| LA0007561     | 203                         | BP  | 1                     | WASTEWATER FROM B-LINE<br>BLEACH   |
| LA0007561     | TX1                         | OOS                                       | 1                     | QUARTERLY 48HR. ACUTE<br>TOXICITY  |
| LA0007927     | 001                         | FE  | 1                     | TREATED PROCESS WASTEWATER         |
| LA0007927     | 002                         | OOS                                       | 1                     | NON-PROCESS AREA STORMWATER        |
| LA0007927     | 101                         | BP  | 1                     | PROCESS WASTEWATER                 |
| LA0007927     | TX1                         | OOS                                       | 3                     | QUARTERLY CHRONIC TOXICITY-<br>001 |
| MD000142      | 001                         | OOS                                       | 1                     | NONCONTACT COOLING WATER           |
| MD000142      | 002                         | OOS                                       | 1                     | NONCONTACT COOLING WATER           |
| MD000142      | 003                         | OOS                                       | 1                     | ASH/WATER SLUDGE SUPERNATE         |
| MD000142      | 004                         | OOS                                       | 1                     | NONCONTACT COOLING WATER           |
| MD000142      | 005                         | OOS                                       | 1                     | NONCONTACT COOLING WATER           |
| MD000142      | 006                         | OOS                                       | 1                     | NONCONTACT COOLING WATER           |
| MD000142      | 007                         | FE  | 1                     | influent chamber of the POTW       |
| MD000142      | 01S                         | OOS                                       | 2                     | 01S OUTFALL                        |
| MD000142      | 02S                         | OOS                                       | 2                     | 02S OUTFALL                        |
| MD000142      | 03S                         | OOS                                       | 2                     | ASH & RAW WATER SLUDGE             |
| MD000142      | 04S                         | OOS                                       | 2                     | 04S OUTFALL                        |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description       |
|---------------|-----------------------------|---|-----------------------|-----------------------------------|
| MD000142      | 05S                         | OOS                                       | 2                     | OUTFALL 05S                       |
| MD000142      | 06S                         | OOS                                       | 2                     | OUTFALL 06S                       |
| MD000142      | 101                         | OOS                                       | 2                     | UGS GAUGING STATION LUKE          |
| MD002168      | 001                         | FE  | 1                     | IND AND MUN WASTEWATER            |
| MD002168      | 01S                         | OOS                                       | 3                     | OUTFALL 01S                       |
| MD002168      | 101                         | OOS                                       | 3                     | INFLUENT/CHLOR MUN SEWAGE         |
| ME000016      | 001                         | FE  | 2                     | TREATED PROCESS WASTEWATER        |
| ME000016      | 002                         | OOS                                       | 2                     | RECOVERY CONDENSATE &<br>COOLANT  |
| ME000016      | 003                         | OOS                                       | 2                     | FILTER HOUSE BCKWASH WATER        |
| ME000016      | 009                         | OOS                                       | 2                     | TRASH SCREEN SHOWER WATER         |
| ME000016      | 020                         | OOS                                       | 2                     | COOLING WATER RECOVERY<br>PLANT   |
| ME000187      | 001                         | FE  | 1                     | TREATED PROCESS WASTEWATER        |
| ME000187      | 002                         | OOS                                       | 2                     | COOLING,CONDENSATE & STORM<br>H2O |
| ME000187      | 003                         | OOS                                       | 2                     | TURBINE/BLEACH PLANT COOLING      |
| ME000193      | 001                         | FE  | 1                     | TREATED PROCESS WASTEWATER        |
| ME000200      | 001                         | FE  | 2                     | TREATED PROCESS WASTEWATER        |
| ME000200      | 003                         | OOS                                       | 2                     | TOXICITY TESTING AND TCDD         |
| ME000202      | 001                         | FE  | 1                     | TREATMENT PLANT EFFLUENT          |
| ME000202      | 002                         | OOS                                       | 1                     | NON CONTACT COOLING WATER         |
| ME000202      | 003                         | OOS                                       | 1                     | FILTER BACKWASH WATER             |
| ME000202      | 004                         | OOS                                       | 1                     | STEAM CONDENSATE/WOOD ROOM        |
| ME000202      | 006                         | OOS                                       | 1                     | STEAM CONDENSATE                  |
| ME000202      | 100                         | BP  | 1                     | INTERNAL WASTE STREAM             |
| ME000205      | 001                         | FE  | 1                     | TREATED PROCESS WASTEWATER        |
| ME000205      | 002                         | OOS                                       | 2                     | NON CONTACT COOLING WATER         |
| ME000205      | 003                         | OOS                                       | 2                     | NON CONTACT COOLING WATER         |
| ME000205      | 004                         | OOS                                       | 2                     | NON CONTACT COOLING WATER         |
| ME000232      | 001                         | FE  | 2                     | TREATED PROCESS WASTEWATER        |
| ME000232      | 002                         | OOS                                       | 2                     | SANDFILTER BACKWASH               |
| ME000232      | 003                         | OOS                                       | 2                     | NON CONTACT COOLING WATER         |
| ME000232      | 100                         | BP  | 2                     | INTERNAL WASTE STREAM             |
| ME002152      | 001                         | FE  | 1                     | TREATED PROCESS WASTEWATER        |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description  |
|---------------|-----------------------------|---|-----------------------|--|
| ME002152      | 002                         | OOS                                       | 2                     | STORMWATER RUNOFF  |
| ME002152      | 003                         | OOS                                       | 2                     | STORMWATER RUNOFF  |
| ME002152      | 004                         | OOS                                       | 2                     | STORMWATER RUNOFF  |
| ME002152      | 005                         | OOS                                       | 2                     | STORMWATER RUNOFF  |
| ME002152      | 007                         | OOS                                       | 2                     | STORMWATER RUNOFF  |
| ME002152      | 100                         | BP  | 1                     | BLEACH PLANT   |
| MI0000027     | 001                         | FE  | 1                     | WASTEWATER TO ESCANABA RIVER   |
| MI0000027     | 002                         | OOS                                       | 2                     | NONCONT COOL H2O TO ESCANABA R   |
| MI0000027     | 00A                         | BP  | 2                     | OUTFALL 00A THROUGH 001;<br>WAST=01  |
| MI0001210     | 001                         | OOS                                       | 2                     | 001A/NONCONTACT COOLING  |
| MI0027391     | 001                         | FE  | 1                     | 001 MOSQUITO CREEK DISCHARGE   |
| MI0027391     | 002                         | OOS                                       | 2                     | 002 WASTEWATER BIG BLACK CREEK   |
| MI0027391     | 101                         | OOS                                       | 2                     | 101 WASTEWATERS MUSKEGON RIVER   |
| MI0042170     | 001                         | FE  | 2                     | FACILITY DISCHARGE   |
| MI0042170     | 001                         | BP  | 2                     | 001B BLEACH PLT PROCESS WASTEW   |
| MN000143      | 010                         | OOS                                       | 2                     | 010 NON-CONTACT COOLING WATER  |
| MN000143      | 020                         | OOS                                       | 2                     | Clearwell overflow discharge   |
| MN000143      | 030                         | FE  | 2                     | Proc water supply line dschg   |
| MN000143      | 701                         | OOS                                       | 2                     | Stream monitoring  |
| MN000164      | 001                         | FE  | 1                     | Total process effluent discharge   |
| MN000164      | 030                         | OOS                                       | 2                     | Dioxin & Furan Monitoring  |
| MN000164      | 040                         | OOS                                       | 2                     | LIFT STATION #8 BYPASS   |
| MN000164      | 050                         | OOS                                       | 2                     | LIFT STATION #2 BYPASS   |
| MN000164      | 060                         | OOS                                       | 2                     | LIFT STATION #3 BYPASS   |
| MN000164      | 501                         | OOS                                       | 2                     | PRIMARY & SECONDARY SLUDGES  |
| MN000164      | 950                         | BP  | 2                     | BLEACH PLANT EFFLUENT  |
| MN004978      | 010                         | FE  | 2                     | DRID Q=Quarterly effluent; DRID M=001 Total Facility Discharge; Identified as 001 in Permit issued 8-27-2002 |



### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description      |
|---------------|-----------------------------|---|-----------------------|----------------------------------|
| MN004978      | 701                         | OOS                                       | 2                     | Blatnik Bridge Monitoring        |
| MN004978      | 702                         | OOS                                       | 2                     | Raw water intake                 |
| MN004978      | 703                         | OOS                                       | 2                     | SUPERIOR/CLOQUET WATER<br>INTAKE |
| MS000267      | 001                         | FE  | 2                     | TOTAL PROCESS OUTFALL            |
| MS003170      | 001                         | FE  | 2                     | PROCESS WASTEWATER               |
| MS003170      | 002                         | OOS                                       | 2                     | SANITARY WASTEWATER              |
| MS003170      | 003                         | BP  | 2                     | INTERNAL OUTFALL PROCESS WW      |
| MS003641      | 001                         | FE  | 1                     | PROCESS WASTEWATER               |
| MS003641      | 002                         | OOS                                       | 2                     | MILL STEAM CONDENSATES FIRE      |
| MS003641      | 003                         | BP  | 1                     | INTERNAL OUTFALL-PROCESS WW      |
| MT000003      | 001                         | FE  | 2                     | DISCHARGE FROM OUTFALL 001       |
| MT000003      | 002                         | FE  | 2                     | DISCHARGE FROM OUTFALL 002       |
| MT000003      | 003                         | FE  | 2                     | DISCHARGE FROM OUTFALL 003       |
| MT000003      | 004                         | OOS                                       | 2                     | UNCONTAMINATED COOLING<br>WATER  |
| MT000003      | CDD                         | OOS                                       | 2                     | COLLECTIVE DIRECT DISCHARGE      |
| MT000003      | RIV                         | OOS                                       | 2                     | CLARK FORK RIVER                 |
| MT000003      | SUM                         | OOS                                       | 2                     | COMBINED ANNUAL DISCHARGE        |
| NC000027      | 001                         | FE  | 2                     | EFF                              |
| NC000027      | 002                         | BP  | 2                     | Pine bleach plant                |
| NC000027      | 003                         | BP  | 2                     | Hardwood bleach plant            |
| NC000068      | 001                         | FE  | 1                     | PROCESS WATER                    |
| NC000068      | 002                         | OOS                                       | 1                     | PROCESS WW                       |
| NC000068      | 005                         | OOS                                       | 2                     | NONCONTACT COOLING/FINE<br>PAPER |
| NC000319      | 001                         | FE  | 1                     | EFF                              |
| NC000319      | 003                         | BP  | 1                     | bleach plant effluent            |
| NC000329      | 001                         | FE  | 1                     | EFF                              |
| NH000065      | 001                         | OOS                                       | 2                     | NON-CONTACT COOLING WATER        |
| NH000065      | 003                         | OOS                                       | 2                     | NON-CONTACT COOLING WATER        |
| NH000065      | 005                         | OOS                                       | 2                     | NON-CONTACT COOLING WATER        |
| NH000065      | 009                         | OOS                                       | 2                     | NON-CONTACT COOLING WATER        |
| NH000065      | 010                         | OOS                                       | 2                     | BURGESS FILTER HOUSE<br>BACKWASH |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description                                      |
|---------------|-----------------------------|---|-----------------------|--|
| NH000065      | 011                         | OOS                                       | 2                     | NON-CONTACT COOLING WATER  |
| NH000065      | 013                         | OOS                                       | 2                     | BURGESS HOT WATER OVERFLOW                                       |
| NH000065      | 014                         | OOS                                       | 2                     | NON-CONTACT COOLING WATER  |
| NH000065      | 015                         | OOS                                       | 2                     | NON-CONTACT COOLING WATER  |
| NH000065      | 016                         | FE  | 2                     | PROCESS AND STORMWATER   |
| NH000065      | 017                         | OOS                                       | 2                     | CASCADE FILTER<br>BACKWASH/OVERFL                                |
| NH000065      | 018                         | OOS                                       | 2                     | CASCADE TREATED<br>PROCESS/WASTEWA                               |
| NH000065      | 100                         | BP  | 2                     | TESTING BLEACH PLANT<br>EFFLUENT                                 |
| NH000065      | SUM                         | OOS                                       | 2                     | COMBINATION OUTFALLS 016 & 018                                   |
| NY0004413     | 001                         | FE  | 1                     | PROCESS WASTEWATER   |
| NY0004413     | 002                         | OOS                                       | 2                     | SANITARY WASTEWATER  |
| NY0004413     | 01A                         | BP  | 1                     | BLEACH PLANT WASTEWATER<br>INTNL                                 |
| NY0005525     | 008                         | FE  | 1                     | PROCESS DISCHARGE  |
| NY0005525     | 009                         | OOS                                       | 1                     | Stormwater   |
| NY0005525     | 011                         | OOS                                       | 1                     | Cooling Water, Fresh Water Overflow to<br>Forebay (Hudson River) |
| NY0005525     | 012                         | OOS                                       | 1                     | Cooling Water, Fresh Water Overflow to<br>Hudson River           |
| NY0005525     | 08A                         | BP  | 1                     | Bleach Plant Effluent  |
| OH000448      | 001                         | FE  | 1                     | 001 EFFLUENT   |
| OH000448      | 002                         | OOS                                       | 1                     | Storm water effluent   |
| OH000448      | 003                         | OOS                                       | 1                     | Storm water effluent   |
| OH000448      | 004                         | OOS                                       | 1                     | Storm water effluent   |
| OH000448      | 005                         | OOS                                       | 1                     | Storm water effluent   |
| OH000448      | 006                         | OOS                                       | 1                     | Storm water effluent   |
| OH000448      | 007                         | OOS                                       | 1                     | Storm water effluent   |
| OH000448      | 008                         | OOS                                       | 1                     | Storm water effluent   |
| OH000448      | 009                         | OOS                                       | 1                     | Storm water effluent   |
| OH000448      | 582                         | OOS                                       | 1                     | 582 (BYPRO) SLUDGE REMOVED<br>FRO                                |
| OH000448      | 586                         | OOS                                       | 1                     | 586 (BYPRO) SLUDGE REMOVED<br>FRO                                |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description       |
|---------------|-----------------------------|---|-----------------------|-----------------------------------|
| OH000448      | 600                         | BP  | 1                     | 600 INTERNAL MONITORING<br>STATIO |
| OH000448      | 802                         | OOS                                       | 1                     | 802 PAINT CREEK, UPSTREAM OF 0    |
| OH000448      | 902                         | OOS                                       | 1                     | 902 PAINT CREEK,DOWNSTREAM<br>OF  |
| OH000448      | 903                         | OOS                                       | 2                     | 903 PAINT CREEK, DOWNSTREAM 1,    |
| OR000079      | 001                         | FE  | 1                     | PROCESS EFFLUENT                  |
| OR000079      | 002                         | OOS                                       | 2                     | CRAWFORD CREEK STORM WATER        |
| OR000079      | 003                         | OOS                                       | 1                     | WTP FILTER BACKWASH DITCH         |
| OR000079      | 004                         | OOS                                       | 2                     | LOG WASHER EFFLUENT               |
| OR000079      | FAC                         | BP  | 2                     | BLEACH PLANT STREAM               |
| OR000107      | 001                         | FE  | 2                     | PROCESS & SANITARY<br>WASTEWATER  |
| OR000107      | 00S                         | OOS                                       | 2                     | SANITARY STP EFFLUENT             |
| PA0002143     | 001                         | OOS                                       | 1                     | 001-DILL HILL CLOS ACT RUNOFF     |
| PA0002143     | 002                         | FE  | 1                     | 002 MILL & MISC WASTEWATER        |
| PA0002143     | 004                         | OOS                                       | 2                     | 004 PULP MILL SW RUNOFF-EMER      |
| PA0002143     | 102                         | OOS                                       | 1                     | #5 PAPER MACHINE AREA SW<br>RUNOF |
| PA0002143     | 202                         | BP  | 1                     | Bleach Plant                      |
| PA0008265     | 001                         | FE  | 1                     | TOTAL FACILITY DISCHARGE          |
| PA0008265     | 002                         | OOS                                       | 2                     | STORMWATER OUTFALL 002            |
| PA0008265     | 003                         | OOS                                       | 2                     | STORMWATER OUTFALL 003            |
| PA0008265     | 004                         | OOS                                       | 2                     | STORMWATER OUTFALL 004            |
| PA0008265     | 005                         | OOS                                       | 2                     | STORMWATER OUTFALL 005            |
| PA0008265     | 006                         | OOS                                       | 2                     | STORMWATER OUTFALL 006            |
| PA0008265     | 007                         | OOS                                       | 2                     | STORMWATER OUTFALL 007            |
| PA0008265     | 008                         | OOS                                       | 2                     | STORMWATER OUTFALL 008            |
| PA0008265     | 009                         | OOS                                       | 2                     | STORMWATER OUTFALL 009            |
| PA0008265     | 010                         | OOS                                       | 2                     | STORMWATER OUTFALL 010            |
| PA0008265     | 011                         | OOS                                       | 2                     | STORMWATER OUTFALL 011            |
| PA0008265     | 012                         | OOS                                       | 2                     | STORMWATER OUTFALL 012            |
| PA0008265     | 013                         | OOS                                       | 2                     | STORMWATER OUTFALL 013            |
| PA0008265     | 014                         | OOS                                       | 2                     | STORMWATER OUTFALL 014            |
| PA0008265     | 015                         | OOS                                       | 2                     | STORMWATER OUTFALL 015            |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description                 |
|---------------|-----------------------------|---|-----------------------|---|
| PA0008265     | 016                         | OOS                                       | 2                     | STORMWATER OUTFALL 016                      |
| PA0008265     | 017                         | OOS                                       | 2                     | STORMWATER OUTFALL 017                      |
| PA0008265     | 018                         | OOS                                       | 2                     | STORMWATER OUTFALL 018                      |
| PA0008265     | 019                         | OOS                                       | 2                     | STORMWATER OUTFALL 019                      |
| PA0008265     | 020                         | OOS                                       | 2                     | STORMWATER OUTFALL 020                      |
| PA0008265     | 101                         | BP  | 1                     | 101-1ST,2ND,3RD STAGE BLEACH P              |
| PA0008869     | 001                         | FE  | 1                     | OUTFALL 001                                 |
| PA0008869     | 002                         | OOS                                       | 2                     | 002-NON CONTACT COOLING<br>WATER            |
| PA0008869     | 101                         | BP  | 1                     | IMP 101-BLEACH PLT EFFL-SOFTWD              |
| PA0008869     | 102                         | BP  | 1                     | IMP 102-BLEACH PLT EFFL-<br>HARDWD          |
| PA0008869     | S11                         | OOS                                       | 2                     | STORMWATER OUTFALL SW11                     |
| PA0008869     | S27                         | OOS                                       | 2                     | STORMWATER OUTFALL SW27                     |
| PA0008869     | S40                         | OOS                                       | 2                     | STORMWATER OUTFALL SW40                     |
| PA0008869     | S41                         | OOS                                       | 2                     | STORMWATER OUTFALL SW41                     |
| PA0008869     | S42                         | OOS                                       | 2                     | STORMWATER OUTFALL SW42                     |
| PA0008869     | SW1                         | OOS                                       | 2                     | STORMWATER OUTFALL SW1                      |
| PA0008885     | 001                         | FE  | 3                     | OUTFALL 001                                 |
| PA0008885     | 003                         | OOS                                       | 2                     | 003 EMER SPILL BASIN OUTFALL                |
| PA0026301     | 001                         | FE  | 3                     | OUTFALL 001                                 |
| PA0026301     | 002                         | OOS                                       | 2                     | ORF OVERFLOW                                |
| PA0026301     | 101                         | BP  | 2                     | INTERNAL MP 101/MAIN TPWS                   |
| PA0026301     | 201                         | OOS                                       | 2                     | EFFLUENT FROM OVERFLOW RET<br>FAC           |
| SC0000868     | 001                         | FE  | 1                     | TOTAL FACILITY DISCHARGE                    |
| SC0000868     | 01A                         | BP  | 1                     | Line A                                      |
| SC0000868     | 01B                         | BP  | 1                     | Line B                                      |
| SC0000868     | 01C                         | BP  | 1                     | Line C                                      |
| SC0001015     | 001                         | FE  | 2                     | 001 PROCESS WASTEWATER                      |
| SC0001015     | 003                         | OOS                                       | 3                     |   |
| SC0001015     | 005                         | OOS                                       | 3                     |   |
| SC0001015     | 01A                         | OOS                                       | 1                     | facility's sanitary wastewater              |
| SC0001015     | 01B                         | BP  | 1                     | Bleach Plant Testing, internal point source |
| SC0038121     | 001                         | FE  | 1                     | PROCESS/SANITARY/RUNOFF                     |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description                                   |
|---------------|-----------------------------|---|-----------------------|---|
| SC0038121     | 01A                         | OOS                                       | 1                     | TREATED SANITARY EFFLUENT                                     |
| SC0038121     | 01B                         | BP  | 1                     | Bleach Plant  |
| SC0038121     | 01C                         | BP  | 1                     | Bleach Plant  |
| SC0042188     | 001                         | FE  | 1                     |   |
| SC0042188     | 01A                         | OOS                                       | 3                     |   |
| SC0042188     | 01B                         | BP  | 1                     |   |
| SC0042188     | T11                         | OOS                                       | 3                     |   |
| SC0042188     | T12                         | OOS                                       | 3                     |   |
| SC0042188     | TB1                         | OOS                                       | 3                     |   |
| SC0042188     | TB2                         | OOS                                       | 3                     |   |
| TN0001643     | 001                         | FE  | 1                     | RAW TRE,POW GEN,PUL/PAP, ST<br>WA                             |
| TN0001643     | 005                         | OOS                                       | 1                     | NONCONTACT COOLING WATER                                      |
| TN0001643     | 01A                         | BP  | 1                     | Internal monitoring point, effluent from<br>bleach plant only |
| TN0001643     | 01T                         | OOS                                       | 2                     | ANNUAL BIOMONITORING  |
| TN0001643     | S07                         | OOS                                       | 2                     | STORMWATER RUNOFF   |
| TN0001643     | S08                         | OOS                                       | 2                     | STORMWATER RUNOFF   |
| TN0001643     | S09                         | OOS                                       | 2                     | STORMWATER RUNOFF   |
| TN0001643     | S10                         | OOS                                       | 2                     | STORMWATER RUNOFF   |
| TN0001643     | S11                         | OOS                                       | 2                     | STORMWATER RUNOFF   |
| TN0001643     | S12                         | OOS                                       | 2                     | STORMWATER RUNOFF   |
| TN0001643     | S13                         | OOS                                       | 2                     | STORMWATER RUNOFF   |
| TN0001643     | S14                         | OOS                                       | 2                     | STORM WATER RUNOFF  |
| TN0001643     | S16                         | OOS                                       | 2                     | STORMWATER RUNOFF   |
| TN0001643     | S17                         | OOS                                       | 2                     | STORM WATER RUNOFF  |
| TN0001643     | S18                         | OOS                                       | 2                     | STORMWATER RUNOFF   |
| TN0001643     | S19                         | OOS                                       | 2                     | STORMWATER RUNOFF   |
| TN0002356     | 001                         | FE  | 1                     | RAIN RUNOFF-COAL STORAGE<br>AREA                              |
| TN0002356     | 003                         | OOS                                       | 1                     | UNCONTAMINATED COOLING<br>WATER                               |
| TN0002356     | 004                         | OOS                                       | 1                     | TRAV SCRE FILT BKW/PUMP COOL<br>W                             |
| TN0002356     | 005                         | OOS                                       | 1                     | TRAV SCRE FILT BW/PUMP COOL<br>WA                             |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description                        |
|---------------|-----------------------------|---|-----------------------|--|
| TN0002356     | 006                         | OOS                                       | 1                     | COAL PILE RUNOFF, STORMWATER                       |
| TN0002356     | 01A                         | BP  | 1                     | PROCESS WW   |
| TN0002356     | 01B                         | BP  | 1                     | PROCESS WW   |
| TN0002356     | 01T                         | OOS                                       | 2                     | BI-ANNUAL BIOMONITORING                            |
| TN0002356     | 02A                         | BP  | 2                     | INTERN MONIT PT, TREA DOMES<br>WW                  |
| TX0000167     | 001                         | FE  | 1                     | TREATED PROCESS WASTEWATER                         |
| TX0000167     | 101                         | OOS                                       | 1                     | TREATED PROCESS WASTEWATER<br>at the aeration pond |
| TX0000167     | 102                         | OOS                                       | 3                     | YEARLY REPORTING - OUTFALL 102                     |
| TX0000167     | 103                         | OOS                                       | 3                     | YEARLY REPORTING - OUTFALL 103                     |
| TX0001643     | 001                         | FE  | 2                     | TREATED PROCESS WASTEWATER                         |
| TX0001643     | 002                         | OOS                                       | 2                     | STORMWATER RUNOFF                                  |
| TX0001643     | TX1                         | OOS                                       | 2                     | TOXICITY REPORTING FOR 001                         |
| TX0003891     | 001                         | FE  | 2                     | PROCESS DISCHARGE                                  |
| TX0003891     | 002                         | OOS                                       | 2                     | STORMWATER RUNOFF                                  |
| TX0003891     | 01A                         | FE  | 2                     | PROCESS WASTEWATER - 01A                           |
| TX0003891     | 101                         | BP  | 1                     | Bleach plant No. 4                                 |
| TX0003891     | 102                         | OOS                                       | 1                     | FILTER BACKWASH                                    |
| TX0003891     | 201                         | BP  | 1                     | Bleach plant No. 5                                 |
| TX0003891     | TX1                         | OOS                                       | 2                     | 48-HOUR ACUTE FRESHWATER -001                      |
| TX0003891     | TXA                         | OOS                                       | 2                     | 24-HOUR ACUTE FRESHWATER - 001                     |
| TX0052591     | 001                         | FE  | 2                     | TOTAL TREATED EFFLUENT<br>OUTFALL                  |
| TX0052591     | 01A                         | OOS                                       | 2                     | QUARTERLY REPORTING FOR 001B                       |
| TX0052591     | 01B                         | OOS                                       | 2                     | ANNUAL REPORTING                                   |
| TX0052591     | SLD                         | OOS                                       | 2                     | LANDFILL   |
| TX0052591     | SLL                         | OOS                                       | 2                     | LAND APPLICATION                                   |
| TX0052591     | SLS                         | OOS                                       | 2                     | SURFACE DISPOSAL                                   |
| TX0052591     | TX1                         | OOS                                       | 2                     | TOXICITY REPORTING FOR 001B                        |
| TX0053023     | 001                         | FE  | 2                     | TOTAL REGULATED DISCHARGE                          |
| TX0053023     | 002                         | OOS                                       | 2                     | STORMWATER - 002                                   |
| TX0053023     | 003                         | OOS                                       | 2                     | STORMWATER - 003                                   |
| TX0053023     | 004                         | OOS                                       | 2                     | STORMWATER - 004                                   |
| TX0053023     | SLD                         | OOS                                       | 2                     | QUARTERLY REPORTING - SLUDGE                       |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description            |
|---------------|-----------------------------|---|-----------------------|--|
| TX0053023     | TX1                         | OOS                                       | 2                     | TOXICITY REPORTING FOR 001             |
| TX0053023     | TXA                         | OOS                                       | 2                     | SEMI-ANNUAL 24HR ACUTE TOX-001         |
| VA0003115     | 001                         | FE  | 3                     |  |
| VA0003115     | 005                         | OOS                                       | 3                     |  |
| VA0003115     | 008                         | OOS                                       | 3                     |  |
| VA0003115     | 101                         | BP  | 3                     |  |
| VA0003115     | 102                         | BP  | 3                     |  |
| VA0003646     | 001                         | OOS                                       | 1                     |  |
| VA0003646     | 002                         | OOS                                       | 1                     |  |
| VA0003646     | 003                         | FE  | 1                     |  |
| VA0003646     | 004                         | OOS                                       | 1                     |  |
| VA0003646     | 005                         | OOS                                       | 1                     |  |
| VA0003646     | 006                         | OOS                                       | 1                     |  |
| VA0003646     | 007                         | OOS                                       | 1                     |  |
| VA0003646     | 008                         | OOS                                       | 1                     |  |
| VA0003646     | 009                         | OOS                                       | 1                     |  |
| VA0003646     | 010                         | OOS                                       | 1                     |  |
| VA0003646     | 011                         | OOS                                       | 1                     |  |
| VA0003646     | 012                         | OOS                                       | 1                     |  |
| VA0003646     | 013                         | OOS                                       | 1                     |  |
| VA0003646     | 014                         | OOS                                       | 1                     |  |
| VA0003646     | 015                         | OOS                                       | 1                     |  |
| VA0003646     | 301                         | BP  | 1                     | internal outfall on A unit bleach line |
| VA0003646     | 302                         | BP  | 1                     | internal outfall on B unit bleach line |
| VA0003646     | 303                         | BP  | 1                     | internal outfall on C unit bleach line |
| VA0003646     | 401                         | OOS                                       | 1                     |  |
| VA0003646     | 999                         | OOS                                       | 1                     |  |
| VA0004162     | 001                         | FE  | 1                     | Final Effluent                         |
| VA0004162     | 101                         | BP  | 1                     | "D" Bleach Plant Effluent              |
| VA0004162     | 102                         | BP  | 1                     | "E" Bleach Plant Effluent              |
| VA0004162     | 103                         | BP  | 1                     | "F" Bleach Plant Effluent              |
| WA0000012     | 001                         | FE  | 1                     | COMBINED OUTFALL 001/002               |
| WA0000012     | 003                         | OOS                                       | 1                     | Stormwater                             |

### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description    |
|---------------|-----------------------------|---|-----------------------|--------------------------------|
| WA000012      | 005                         | OOS                                       | 2                     | SANITARY SEWAGE TREATMENT PLNT |
| WA000025      | 001                         | FE  | 1                     | PULP MILL & STP DISCHARGE      |
| WA000025      | 002                         | OOS                                       | 1                     | DISCHARGE TO BLUE CREEK        |
| WA000025      | 00S                         | OOS                                       | 1                     | SEWAGE PACKAGE PLANT           |
| WA000062      | 001                         | FE  | 3                     | PAPER FROM PURCHASED PULP      |
| WA0000621     | 003                         | OOS                                       | 1                     |                                |
| WA0000621     | 008                         | OOS                                       | 1                     |                                |
| WA0000621     | 00F                         | OOS                                       | 1                     |                                |
| WA0000850     | 001                         | FE  | 1                     | COMMENCEMENT BAY DISCHARGE     |
| WA0001091     | 009                         | FE  | 1                     | TOTAL PLANT DISCHARGE          |
| WA0003697     | 001                         | FE  | 1                     | PULP & PAPER MILL DISCHARGE    |
| WI0003212     | 001                         | FE  | 1                     | TREATED PROCESS WASTEWATER     |
| WI0003212     | 005                         | OOS                                       | 1                     | EVAPORATORWATERS               |
| WI0003212     | 006                         | OOS                                       | 1                     | 006A VACUUM PUMP SEAL          |
| WI0003212     | 009                         | OOS                                       | 1                     | 006B NONCONTACTCOOL WATER      |
| WI0003379     | 002                         | OOS                                       | 1                     | OUTFALL 002 DISPOSAL WELL      |
| WI0003379     | 003                         | OOS                                       | 1                     | OUTFALL 003 BARRIER WELL       |
| WI0003379     | 004                         | FE  | 1                     | TREATED PROCESS WASTEWATER     |
| WI0003379     | 104                         | OOS                                       | 3                     | REPORT 004A AS 104             |
| WI0003620     | 001                         | OOS                                       | 1                     | CLO2 LIFT STA EMERG.OVERFLOW   |
| WI0003620     | 002                         | FE  | 1                     | WWTP EFFLUENT                  |
| WI0003620     | 003                         | OOS                                       | 2                     | PE#8 PAPERMACH CLEARWTR SEWER  |
| WI0003620     | 005                         | OOS                                       | 2                     | NEPCO LAKEALUM SLDG SETTLE BSN |
| WI0003620     | 006                         | OOS                                       | 2                     | NEKOOSA CLEARWATERSEWER        |
| WI0003620     | 007                         | OOS                                       | 2                     | PE BLEACH PLT EMERG OVERFLOW   |
| WI0003620     | 008                         | OOS                                       | 2                     | NEK COLL. TANK EMER.OVERFLOW   |
| WI0003620     | 009                         | OOS                                       | 2                     | PE COLL. TANK EMER.OVERFLOW    |
| WI0003620     | 011                         | OOS                                       | 2                     | NEKOOSA STNDPIPE OVERFLOW      |
| WI0003620     | 013                         | OOS                                       | 2                     | PIPE 099 RENUMBERED AS 013     |
| WI0003620     | 099                         | OOS                                       | 2                     | COMBINED DISCH FROM1,2,7,8,9   |



### PCS Discharge Locations and EPA Designated Pipe Usage

| Mill<br>NPDES | Discharge<br>Pipe<br>(DSCH) | EPA Designated<br>Pipe Usage <sup>a</sup> | Evidence <sup>b</sup> | Pipe or Outfall Description      |
|---------------|-----------------------------|---|-----------------------|----------------------------------|
| WI0026042     | 010                         | FE  | 1                     | WWTP EFFLUENT                    |
| WI0026042     | 011                         | OOS                                       | 1                     | EMERGENCY PULP MILL<br>OVERFLOW  |
| WI0026042     | 012                         | OOS                                       | 1                     | EMERGENCY PAPER<br>MILLOVERFLOW  |
| WI0026042     | 013                         | OOS                                       | 1                     | WOODROOM SEWER                   |
| WI0026042     | 014                         | OOS                                       | 1                     | PIPE 098 RENUMBERED 014          |
| WI0026042     | 015                         | OOS                                       | 1                     | NCCW                             |
| WI0026042     | 098                         | OOS                                       | 1                     | 010, 011, 012 & 013 COMBINED     |
| WI0026042     | 110                         | OOS                                       | 1                     | ZID MONITORING                   |
| WI0030651     | 001                         | FE  | 2                     | PLANT EFFLUENT                   |
| WI0030651     | 701                         | OOS                                       | 2                     | INFLUENT TO PLANT                |
| WI0037991     | 001                         | FE  | 1                     | WATER QUALITY CENTER             |
| WI0037991     | 010                         | OOS                                       | 1                     | NONCONTACT COOLING WATER         |
| WI0037991     | 011                         | OOS                                       | 1                     | BIRON DIV.STORMWATER             |
| WI0037991     | 012                         | OOS                                       | 1                     | BIRON DIV.SEAL WATER             |
| WI0037991     | 013                         | OOS                                       | 1                     | BIRON DIV NCCW                   |
| WI0037991     | 014                         | OOS                                       | 1                     | BIRON DIV EMERGENCY OUTFALL      |
| WI0037991     | 015                         | OOS                                       | 1                     | WIS RAPIDSSEAL WATERNCWW         |
| WI0037991     | 016                         | OOS                                       | 1                     | WIS RPD DIV EMERGENCY<br>OUTFALL |
| WI0037991     | 017                         | OOS                                       | 1                     | WIS RAPIDSINFILT. NCCW WI RP     |
| WI0037991     | 018                         | OOS                                       | 1                     | CRANBERRY CREEK OUTFALL          |
| WI0037991     | 019                         | OOS                                       | 1                     | WIS<br>RAPIDSSTORMWATERSEALWATER |
| WI0037991     | 020                         | OOS                                       | 1                     | WR PULP MILLS OVERFLOW           |
| WI0037991     | 021                         | OOS                                       | 1                     | KRAFT DIV NCCW                   |
| WI0037991     | 022                         | OOS                                       | 1                     | PIPE 098 RENAMED 022             |
| WI0037991     | 098                         | OOS                                       | 1                     | 001, 014, 016, 201 COMBINED      |
| WI0037991     | 111                         | OOS                                       | 1                     | BIRON DIV NCCW                   |
| WI0037991     | 201                         | OOS                                       | 1                     | KRAFT DIV PUMP STN EMRGNCY<br>OV |
| WI0037991     | 211                         | OOS                                       | 1                     | BIRON DIV NCCW EFFL              |

a - EPA has designated pipes and outfalls as either Final Effluent (FE), Bleach Plant (BP), Out of Scope (OOS). Out of scope pipes include stormwater runoff, non-contact cooling water, emergency overflow, etc.

## **PCS Discharge Locations and EPA Designated Pipe Usage**

b - EPA used permits and PIPE descriptions contained in the PCS database to designate location. If these two resources provided insufficient information the pollutant discharged was used as indicator. For example, the Cluster Rules require final effluent AOX monitoring, absent additional information the presence of AOX indicates FE. The data source is indicated with either: 1 - permit, 2- PCS pipe description, or 3- pollutant as an indicator.

**Appendix B**

**CURRENT STATUS OF PHASE I MILLS**

## **Appendix B**

### **Current Status of Phase I Mills**

The attached table lists mills that EPA identified as Phase I mills (mills with at least some portion of their wastewater discharges that met the applicability of 40 CFR 430 Subpart B (Bleached Papergrade Kraft and Soda) and Subpart E (Papergrade Sulfite) as of April 15, 1998, when the Cluster Rules were promulgated. The table includes the following:

- **Mill Name** (updated to the 2005 ownership).
- **City.**
- **State.**
- **Phase I Subcategory** which EPA believes applies to at least a portion of mill discharges. Phase I subcategories include bleached papergrade kraft and soda (BPK) and papergrade sulfite (PS).
- **Discharge** status of the mill, either discharge directly to surface waters (i.e., direct dischargers) or to a POTWs (indirect dischargers).
- **SIC code** included in PCS. If the mill is not included in PCS (for instance, if it is an indirect discharge mill) there is no SIC code. The pulp, paper, and paperboard industry corresponds to three separate Standard Industrial Classification (SIC) codes: 2611 (pulp mills), 2621 (paper mills excluding building paper mills), and 2631 (paperboard) which identify the facilities principal product or group of products. For a given mill, the SIC code in PCS may differ from the primary SIC code identified in TRI.
- **NPDES** permit number, for direct discharges.
- **TRI ID** number.
- **SID** - The site identification number given to the mill for EPA's 1990 industry-wide survey.
- **Comment** - about the current operating status of the mill.

EPA requests operators of the mills listed in Appendix B confirm current mill operating status.

## Current Status of Phase I Mills

| Mill Name  | City                    | State | Phase I Sub-category <sup>a</sup> | Dis-charge <sup>b</sup> | SIC <sup>c</sup> Code | NPDES     | TRI ID            | SID <sup>d</sup> | Comment  |
|--|-------------------------|-------|-----------------------------------|-------------------------|-----------------------|-----------|-------------------|------------------|--|
| Container Corp. of America                         | Brewton                 | AL    | BPK                               | D                       | 2611                  | AL0002682 | 36426-CNTNR-HIGHW | 9177             |  |
| Parsons & Whittemore (Alabama River Pulp Co. Inc.) | Claiborne (Perdue Hill) | AL    | BPK                               | D                       | 2621                  | AL0025968 | 36470-LBMRV-OFFHI | 7901             | Shares NPDES and TRI with BPK - SID:5298   |
| (Parsons & Whittemore) Alabama Pine Pulp           | Claiborne (Perdue Hill) | AL    | BPK                               | D                       |                       |           |                   | 5298             | Shares NPDES and TRI with BPK - SID:7901   |
| Kimberly-Clark Corp                                | Coosa Pines             | AL    | BPK                               | D                       | 2611                  | AL0003158 | 35044-SPLPN-ALABA | 697              |  |
| Champion International Corp.                       | Courtland               | AL    | BPK                               | D                       | 2621                  | AL0000396 | 35618-CHMPN-POBOX | 8040             |  |
| Gulf States Paper Corp.                            | Demopolis               | AL    | BPK                               | D                       | 2631                  | AL0002828 | 36732-GLFST-HIGHW | 9233             |  |
| Boise Cascade Corp.                                | Jackson                 | AL    | BPK                               | D                       | 2621                  | AL0002755 | 36545-BSCSC-307WE | 1895             |  |
| James River Corp. (Naheola Mill)                   | Pennington              | AL    | BPK                               | D                       | 2631                  | AL0003301 | 36916-JMSRV-ROUTE | 6515             |  |
| International Paper Co. (Riverdale)                | Selma                   | AL    | BPK                               | D                       | 2611                  | AL0003018 | 36701-HMMRM-RIVER | 2899             |  |
| Domtar   | Ashdown                 | AR    | BPK                               | D                       | 2611                  | AR0002968 | 71822-NKSPP-HIGHW | 4771             |  |
| Georgia-Pacific Corp.                              | Crossett                | AR    | BPK                               | D                       | 2621                  | AR0001210 | 71635-GRGPC-PAPER | 9700             |  |
| Potlatch   | McGehee                 | AR    | BPK                               | D                       | 2631                  | AR0035823 | 71654-PTLTC-HIGHW | 335              |  |
| International Paper Co.(Hammermill)                | Pine Bluff              | AR    | BPK                               | D                       | 2611                  | AR0001970 | 71611-NTRNT-FAIRF | 2910             | Phase II mil in close proximity (NPDES:AR0001601; Mid-America Packaging)                                       |
| Evergreen Pulp Co.                                 | Samoa                   | CA    | BPK                               | D                       | 2611                  | CA0005894 | 95564-LSNPC-LPDRI | 5540             | TCF Mill (uses peroxide bleaching); operates on the edge of profitability; recently bought by Chinese company. |
| Champion International Corp.                       | Cantonment (Pensacola)  | FL    | BPK                               | D                       | 2621                  | FL0002526 | 32533-CHMPN-375MU | 1513             |  |
| Georgia-Pacific Corp.                              | Palatka                 | FL    | BPK                               | D                       | 2621                  | FL0002763 | 32078-GRGPC-STATE | 7805             |  |
| Stone Container Corp.                              | Panama City             | FL    | BPK                               | I                       | 2611                  | FLR05B551 | 32401-STNCN-1EVER | 3771             | indirect; not in PCSLoads2002 (POTW=FL0002631; Bay County Wastewater Treatment Plant)                          |
| Federal Paper Board Co.                            | Augusta                 | GA    | BPK                               | D                       | 2611                  | GA0002801 | 30913-FDRLP-HIGHW | 310              |  |
| Koch Cellulose LLC                                 | Brunswick               | GA    | BPK                               | D                       | 2611                  | GA0003654 | 31520-BRNSW-WEST9 | 3611             |  |
| Weyerhaeuser/Flint River Mill                      | Oglethorpe              | GA    | BPK                               | D                       | 2611                  | GA0049336 | 31068-BCKYC-OLDST | 3114             | minor; not in PCSLoads2002; Project XL participant   |
| Stone Container (Savannah River)                   | Pt. Wentworth           | GA    | BPK                               | D                       | 2611                  | GA0002798 | 31407-STNCN-1BONN | 9982             |  |
| Potlatch   | Lewiston                | ID    | BPK                               | D                       | 2621                  | ID0001163 | 83501-PTLTC-805MI | 2216             |  |

### Current Status of Phase I Mills (Continued)

| Mill Name                           | City                   | State | Phase I Sub-category <sup>a</sup> | Dis-charge <sup>b</sup> | SIC Code | NPDES     | TRI ID            | SID <sup>d</sup> | Comment  |
|-------------------------------------|------------------------|-------|-----------------------------------|-------------------------|----------|-----------|-------------------|------------------|--|
| Willamette Industries Inc.          | Hawesville             | KY    | BPK                               | D                       | 2611     | KY0001716 | 42348-WLLMT-POBOX | 8897             | Recycled cbrd mill closed according to AF&PA, Oct 2002. Pulp and paper mill still open                           |
| New Page                            | Wickliffe              | KY    | BPK                               | D                       | 2621     | KY0000086 | 42087-WSTVC-HIGHW | 6360             |  |
| International Paper Co.             | Bastrop                | LA    | BPK                               | D                       | 2611     | LA0007561 | 71220-NTRNT-705CO | 1907             |  |
| Boise Cascade Corp.                 | Deridder               | LA    | BPK                               | D                       | 2621     | LA0007927 | 70634-BSSTH-USHIG | 9747             |  |
| Tembec                              | St. Francisville       | LA    | BPK                               | D                       | 2611     | LA0003468 | 70775-JMSRV-ENDOF | 5677             |  |
| Georgia-Pacific Corp.               | Zachary (Port Hudson)  | LA    | BPK                               | D                       | 2621     | LA0005258 | 70791-GRGPC-ZACHA | 181              |  |
| New Page                            | Luke                   | MD    | BPK                               | I                       | 2621     | MD0001422 | 21540-WSTVC-300PR | 9926             | indirect; PCSLoads2002 contains TSS, oil & grease, and Aluminum (POTW=MD0021687; Upper Potomac River Commission) |
| International Paper Co. (And'scogn) | Jay                    | ME    | BPK                               | D                       | 2621     | ME0001937 | 04239-NTRNT-RILEY | 6139             |  |
| S.D. Warren (SAPPI)                 | Hinckley (Skowhegan)   | ME    | BPK                               | D                       | 2621     | ME0021521 | 04976-SDWRR-RFD3U | 832              |  |
| Lincoln Pulp & Paper Co.            | Lincoln                | ME    | BPK                               | D                       | 2611     | ME0002003 | 04457-LNCLN-KATAH | 7254             |  |
| Georgia-Pacific                     | Old Town               | ME    | BPK                               | D                       | 2621     | ME0002020 | 04468-JMSRV-PORTL | 9195             |  |
| New Page                            | Rumford                | ME    | BPK                               | D                       | 2621     | ME0002054 | 04276-BSCSC-ROUTE | 4084             |  |
| Domtar Industries Inc.              | Woodland (Baileyville) | ME    | BPK                               | D                       | 2411     | ME0001872 | 04694-GRGPC-MILLA | 2374             |  |
| New Page                            | Escanaba               | MI    | BPK                               | D                       | 2611     | MI0000027 | 49829-MDPBL-COUNT | 1492             |  |
| SAPPI Fine Paper NA                 | Muskegon               | MI    | BPK                               | I                       | 2621     | MI0001210 | 49443-SDWRR-2400L | 5844             | indirect; PCSLoads2002 contains Chlorine (POTW=MI0027391; Muskegon County Wastewater Management System)          |
| Champion International Corp.        | Quinnesec (Norway)     | MI    | BPK                               | D                       | 2611     | MI0042170 | 49876-CHMPN-USHIG | 3042             |  |
| SAPPI                               | Cloquet                | MN    | BPK                               | I                       | 2611     | MN0001431 | 55720-PTLTC-NORTH | 2212             | indirect; not in PCSLoads2002 (POTW=MN0049786; Western Lake Superior Sanitary District)                          |
| Boise Cascade Corp.                 | International Falls    | MN    | BPK                               | D                       | 2611     | MN0001643 | 56649-BSCSC-SECON | 1052             |  |
| Weyerhaeuser Paper Co.              | Columbus               | MS    | BPK                               | D                       | 2621     | MS0036412 | 39703-CLMBS-CARSO | 8662             |  |
| Koch Cellulose LLC                  | New Augusta            | MS    | BPK                               | D                       | 2611     | MS0031704 | 39462-LFRVR-HWY29 | 8525             |  |
| Weyerhaeuser Paper Co.              | New Bern (Vanceboro)   | NC    | BPK                               | D                       | 2611     | NC0003191 | 28560-WYRHS-STREE | 5657             |  |

### Current Status of Phase I Mills (Continued)

| Mill Name                           | City                   | State | Phase I Sub-category <sup>a</sup> | Dis-charge <sup>b</sup> | SIC Code | NPDES     | TRI ID            | SID <sup>d</sup> | Comment  |
|-------------------------------------|------------------------|-------|-----------------------------------|-------------------------|----------|-----------|-------------------|------------------|--|
| Federal Paper Board Co.             | Riegelwood             | NC    | BPK                               | D                       | 2631     | NC0003298 | 28456-FDRLP-RIEGE | 2608             |  |
| Blue Ridge Paper                    | Canton                 | NC    | BPK                               | D                       | 2621     | NC0000272 | 28716-CHMPN-MAINS | 4572             |  |
| Weyerhaeuser Paper Co.              | Plymouth               | NC    | BPK                               | D                       | 2621     | NC0000680 | 27962-WYRHS-TROWB | 8544             |  |
| James River Corp. (Crown Paper Co.) | Berlin                 | NH    | BPK                               | D                       | 2611     | NH0000655 | 03570-JMSRV-650MA | 1688             |  |
| Finch Pruyn & Co Inc.               | Glens Falls            | NY    | PS                                | D                       | 2611     | NY0005525 | 12801-FNCHP-1GLEN | 1277             | PS-B; Ammonium   |
| International Paper Co.             | Ticonderoga            | NY    | BPK                               | D                       | 2611     | NY0004413 | 12883-NTRNT-SHORE | 5123             |  |
| New Page                            | Chillicothe            | OH    | BPK                               | D                       | 2621     | OH0004481 | 45601-MDCRP-401SP | 4696             |  |
| Georgia-Pacific                     | Clatskanie             | OR    | BPK                               | D                       | 2611     | OR0000795 | 97016-JMSRV-WAUNA | 2818             |  |
| Georgia-Pacific                     | Halsey                 | OR    | BPK                               | D                       | 2611     | OR0001074 | 97348-PPTLB-30480 | 1811             |  |
| Boise Cascade Corp.                 | St. Helens             | OR    | BPK                               | D                       | 2611     | OR0020834 | 97051-BSCSC-1300K | 644              | Shares NPDES with POTW   |
| Willamette (Penntech Papers Div.)   | Johnsonburg            | PA    | BPK                               | D                       | 2621     | PA0002143 | 15845-PNNTC-100CE | 4491             |  |
| Appleton Papers Inc.                | Roaring                | PA    | BPK                               | D                       | 2611     | PA0008265 | 16673-PPLTN-100PA | 5701             |  |
| P. H. Glatfelter Co.                | Spring                 | PA    | BPK                               | D                       | 2621     | PA0008869 | 17362-PHGLT-228SO | 4920             | VATIP-Tier 1   |
| Bowater Inc.                        | Catawba                | SC    | BPK                               | D                       | 2611     | SC0001015 | 29704-BWTRC-5300C | 2449             | VATIP-Tier 1; PCS dioxin detect in 2002 confirmed by mill (83.6pg/L) |
| Union Camp Corp.                    | Eastover               | SC    | BPK                               | D                       | 2621     | SC0038121 | 29044-NNCMP-ROUTE | 1421             | VATIP-Tier 1   |
| International Paper Co.             | Georgetown             | SC    | BPK                               | D                       | 2631     | SC0000868 | 29442-NTRNT-KAMIN | 7647             |  |
| Willamette Industries Inc.          | Bennetsville           | SC    | BPK                               | D                       | 2621     | SC0042188 | 29512-WLLMT-HWY91 | 1908             |  |
| Willamette Industries Inc.          | Kingsport              | TN    | BPK                               | D                       | 2621     | TN0001643 | 37662-MDPPR-POBOX | 1146             |  |
| Bowater Inc.                        | Calhoun                | TN    | BPK                               | D                       | 2621     | TN0002356 | 37309-BWTRS-ROUTE | 9523             |  |
| International Paper Co.             | Texarkana (Queen City) | TX    | BPK                               | D                       | 2621     | TX0000167 | 75504-NTRNT-POBOX | 8135             |  |
| Temple Inland Forest Products       | Evadale (Silsbee)      | TX    | BPK                               | D                       | 2631     | TX0003891 | 77656-PLPPP-POBOX | 2647             |  |
| Westvaco Corp.                      | Covington              | VA    | BPK                               | D                       | 2631     | VA0003646 | 24426-WSTVC-RIVER | 4318             |  |
| Union Camp Corp.                    | Franklin               | VA    | BPK                               | D                       | 2611     | VA0004162 | 23851-NNCMP-HIGHW | 6412             | VATIP-Permit does not indicated Tier                                 |
| Smurfit-Stone                       | West Point             | VA    | BPK                               | D                       | 2611     | VA0003115 | 23181-CHSPK-19THM | 5187             |  |
| Weyerhaeuser Paper Co.              | Longview               | WA    | BPK                               | D                       | 2611     | WA0000124 | 98632-WYRHS-3401I | 8668             |  |
| Boise Cascade Corp.                 | Wallula                | WA    | BPK                               | D                       | 2611     | WA0003697 | 99363-BSCSC-POBOX | 732              |  |
| Georgia-Pacific                     | Camas                  | WA    | BPK                               | D                       | 2611     | WA0000256 | 98607-JMSRV-NE4TH | 324              |  |
| Scott Paper                         | Everett                | WA    | PS                                | D                       | 2611     | WA0000621 | 98201-SCTTP-2600F | 5124             | PS-B; Ammonium based   |

### Current Status of Phase I Mills (Continued)

| Mill Name                    | City              | State | Phase I Sub-category <sup>a</sup> | Dis-charge <sup>b</sup> | SIC <sup>c</sup> Code | NPDES     | TRI ID            | SID <sup>d</sup> | Comment  |
|------------------------------|-------------------|-------|-----------------------------------|-------------------------|-----------------------|-----------|-------------------|------------------|--|
| Simpson Tacoma Kraft Co.     | Tacoma            | WA    | BPK                               | D                       | 2611                  | WA0000850 | 98421-SMPSN-801PO | 3720             |  |
| Wausau Paper Mills Co.       | Brokaw            | WI    | PS                                | D                       | 2611                  | WI0003379 | 54417-WSPPR-2NDST | 7080             | PS-A; Magnesium-based bisulfite process  |
| SmartPapers LLC              | Park Falls        | WI    | PS                                | D                       | 2621                  | WI0003212 | 54552-FLMBP-200NO | 23               | PS-A; Calcium based  |
| Stora Enso                   | Wisconsin Rapids  | WI    | BPK                               | D                       | 2611                  | WI0037991 | 54494-CNSLD-950FO | 7850             | In 2002, mill submitted 3 separate TRI release reports (pulp mill, paper mill, and water quality center) |
| Weyerhaeuser Paper Co.       | Rothschild        | WI    | PS                                | D                       | 2621                  | WI0026042 | 54474-WYRHS-200GR | 4139             | PS-A; Calcium based  |
| Domtar Industries Inc.       | Nekoosa           | WI    | BPK                               | D                       | 2611                  | WI0003620 | 54457-NKSML-MARKE | 4468             | Shares NPDES with PS - SID:7163  |
| Domtar Industries Inc.       | Port              | WI    | PS                                | D                       | 2621                  |           | 54469-PRTDW-100WI | 7163             | PS-A; Shares NPDES with BPK - SID:4468   |
| International Paper Co.      | Mobile            | AL    | BPK                               | D                       | 2621                  | AL0002780 |                   | 6354             | idle in '02; PCSLoads2002 contains dioxin, TSS, iron, etc.   |
| Scott Paper Co./SAPPI        | Mobile            | AL    | BPK                               | D                       | 2621                  | AL0002801 | 36652-SCTTP-BAYBR | 4774             | idle after '02; PCSLoads2002 contains BOD5, oil & grease, TSS, etc                                       |
| Simpson Paper Co.            | Anderson          | CA    | BPK                               | D                       |                       |           |                   | 8657             | idle in '02  |
| St. Joe Forest Products Co.  | Port St. Joe      | FL    | BPK                               | I                       |                       | FLR10K742 |                   | 3820             | idle in '02; not in PCSLoads2002   |
| Gilman Paper Co.             | St. Marys         | GA    | BPK                               | D                       | 2611                  | GA0001953 | 31558-GLMNP-1000O | 8850             | idle after '02; PSCLoads2002 contains dioxin, BOD5, and TSS. According to AF&PA, closed October 2002.    |
| Great Northern Paper Co.     | Millinocket       | ME    | PS                                | D                       | 2621                  | ME0000167 | 04462-GRTNR-1KATA | 6841             | phase II   |
| SAPPI Fine Paper NA          | Westbrook         | ME    | BPK                               | D                       | 2621                  | ME0002321 | 04092-SDWRR-89CUM | 130              | phase II   |
| International Paper Co.      | Moss Point        | MS    | BPK                               | I                       | 2621                  | MS0002674 |                   | 7115             | idle in '02; PCSLoads2002 contains BOD5, TSS, dissolved oxygen   |
| Stone Container Corp.        | Missoula          | MT    | BPK                               | D                       | 2611                  | MT0000035 | 59806-STNCN-MULLA | 3218             | phase II   |
| Procter & Gamble Paper       | Mehoopany         | PA    | PS                                | D                       | 2621                  | PA0008885 | 18629-PRCTR-ROUTE | 7401             | phase II   |
| International Paper Co.      | Erie              | PA    | BPK                               | I                       | 2611                  | PA0000124 | 16533-HMMRM-1540E | 3982             | phase II (POTW=PA0026301; Erie City/Erie Sew Auth). According to AF&PA closed June 2002.                 |
| Champion International Corp. | Houston (Sheldon) | TX    | BPK                               | D                       | 2621                  | TX0053023 | 77044-CHMPN-11611 | 4545             | idle after '02; PCSLoads2002 contains AOX, COD, dioxin, etc.   |



### Current Status of Phase I Mills (Continued)

| Mill Name                   | City       | State | Phase I Sub-category <sup>a</sup> | Dis-charge <sup>b</sup> | SIC <sub>c</sub> Code | NPDES     | TRI ID            | SID <sup>d</sup> | Comment  |
|-----------------------------|------------|-------|-----------------------------------|-------------------------|-----------------------|-----------|-------------------|------------------|--|
| Champion International Corp | Lufkin     | TX    | BPK                               | D                       | 2621                  | TX0001643 | 75902-CHMPN-HIGHW | 4079             | idle after '02; PCSLoads2002 contains AOX, dioxin, TSS, etc. According to AF&PA idled indefinitely Oct. 2003   |
| Simpson Paper Co.           | Pasadena   | TX    | BPK                               | I                       | 2621                  |           | 77506-PSDNP-901NS | 2816             | phase II (POTW=TX0005380; Gulf Coast Waste Disposal Auth)  |
| James River II Inc          | Camas      | WA    | PS                                | D                       |                       |           |                   | 324              | idle in '02; Factsheet (issued 4-3-03) excerpt: August 27, 2001, the Camas Mill announced the permanent closure of the sulfite pulp mill and four paper machines |
| Georgia-Pacific Corp.       | Bellingham | WA    | PS                                | D                       | 2611                  | WA0001091 | 98225-GRGPC-300WL | 4005             | idle after '02; PCSLoads2002 contains TSS, mercury, BOD5; (at promulgation the only mill in the specialty grade mills segment)                                   |
| Badger Paper Mills Inc.     | Peshtigo   | WI    | PS                                | I                       |                       |           |                   | 3764             | phase II (POTW=WI0030651; Peshtigo City WWTF)  |

a - Phase I subcategories include bleached papergrade kraft (BPK) and papergrade sulfite (PS) pulping operations.

b - Mill either discharge directly to surface waters (i.e., direct dischargers) or to a POTWs (indirect dischargers).

c - The pulp, paper, and paperboard industry corresponds to three separate Standard Industrial Classification (SIC) codes: 2611 (pulp mills), 2621 (paper mills excluding building paper mills), and 2631 (paperboard) which identify the facilities principal product or group of products. Table lists the SIC code listed in PCS. For a given facility, the SIC code in PCS may differ from the primary SIC code identified in TRI.

d - EPA performed an industry-wide survey in 1990. Each mill was given a survey identification number (SID).